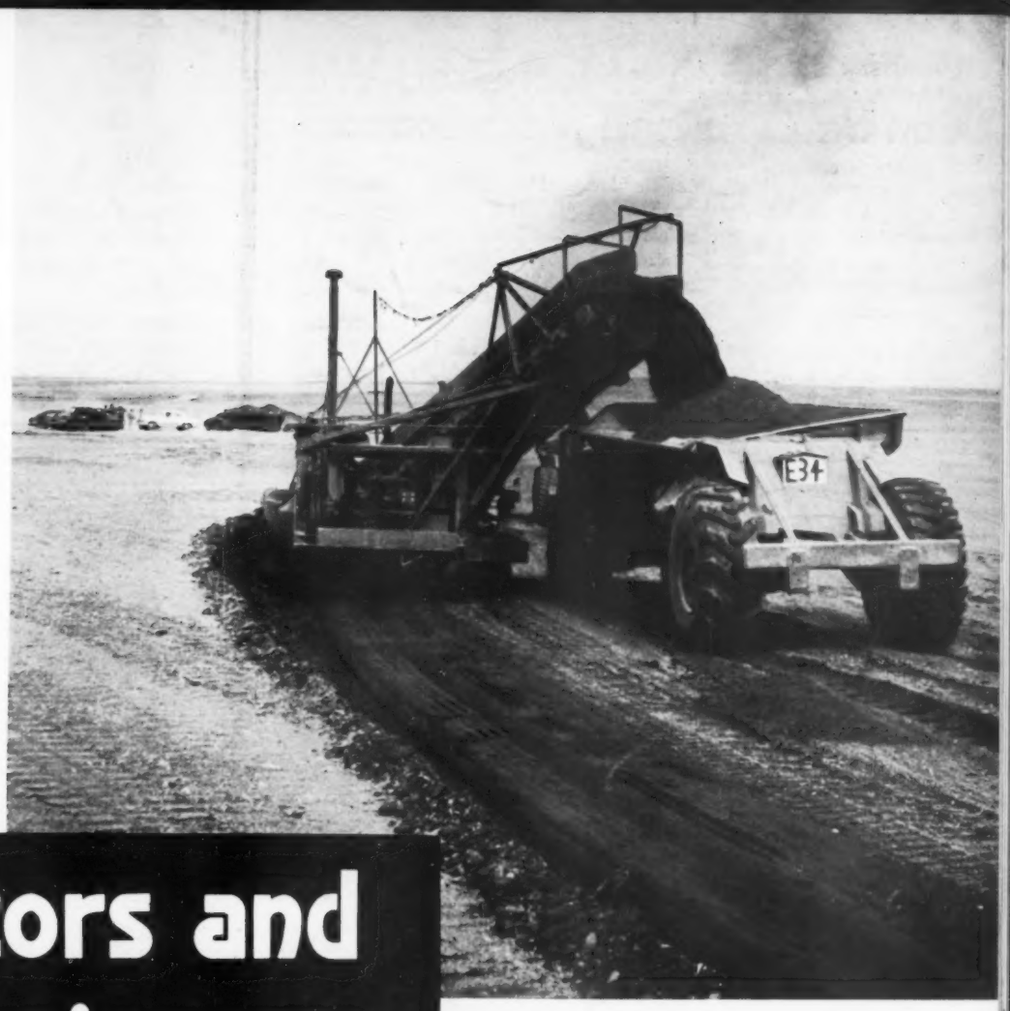

A Euclid loader fills a bottom-dump Euclid with borrow material for Tiber Dam in Montana. In another borrow pit, below, a P&H 1055 shovel, with an Esco 4-yard dipper, loads other units of the Euclid fleet.
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Contractors and Engineers

FEBRUARY 1955

How Concrete of Required Workability Can Be Obtained Most Economically

As every concrete man knows, obtaining increased workability by adding water has two serious disadvantages. First, it increases the cost of the concrete because more cement is required to maintain strength. Second, it lowers the quality of the concrete because it increases shrinkage and permeability and decreases durability.

Experience on thousands of jobs has proved that the best and most economical way to obtain required workability is with Pozzolith. When Pozzolith is added to a plain mix, slump is increased 150% or more.

For equal slump, approximately one gallon (15%) less water per sack of cement is required for a Pozzolith mix. Materials cost is lower . . . plasticity is improved . . . less time is required for placing and finishing.

In addition to producing required workability most economically, Pozzolith reduces shrinkage, lowers permeability and increases durability, because it lowers *unit water content* (water required per cubic yard of concrete).

built in **1941** *concrete in excellent condition*

↑ Kansas City Water Softening Plant, Kansas City, Mo. Engrs.—Burns & McDonnell Engr. Co. and Black & Veatch Engr. Co.; Contr.—S. Patti Constr. Co.—all of Kansas City, Mo.

↓ $900,000 Addition, Engrs.—Burns & McDonnell Engr. Co.; Contr.—Interstate Constr. Co., both of Kansas City, Mo.; Ready-Mixed Concrete Supplied by Concrete Materials Co., Kansas City, Kan.

addition in **1954** *same sound practice followed**

*concrete designed for quality...economy with minimum unit water content

When the Kansas City Water Softening Plant was built in 1941, every means was employed to obtain the highest quality concrete most economically. Today's excellent condition of this 13-year old plant testifies to the success of the builders' efforts.

Pozzolith was one of the means used to get these results. Through dispersion of cement it was an aid in producing *lowest unit water content.* The soundness of this practice is shown in the following, from U. S. Bureau of Reclamation Concrete Manual:

"For a given set of materials and water-cement ratio, the unit water content (water required per cubic yard of concrete) is the most important basic factor affecting the quality of concrete". (Page 130, 5th Edition.)

Information showing how Pozzolith will help obtain the qualities you want in concrete sent on request.

POZZOLITH...

the cement-dispersing, water-reducing agent developed by The Master Builders Co. in 1932, makes available the optimum amount of air in concrete and fully complies with the water-cement ratio law. Added at the mixer.

The MASTER BUILDERS Co

Subsidiary of American-Marietta Company

"IRON-CLAD" CONCRETE FOR HEAVY TRAFFIC AREA

The Masterplate "iron-clad" concrete 4-6 times more wear-resistant than plain concrete floor, also corrosion- spark-safe, easy-to-clean, non-slip, and economical. Non-colored and col

Section of Masterplate Flo
Note Thickness of Armored S

Experience in all types of plants ha the value of Masterplate "iron-cl crete floors in helping to maintain flow of production, reduce ma expense and improve plant safety.

Only with Masterplate can a Masterpl armored" concrete floor with all its service advantages be obtained. This only Masterplate contains the cemen ing agent calcium lignosulfonate whi it possible to easily float a pound o the tough, ductile metal on fresh conc *keep it at the surface.*

Full information on Masterplate—for and resurfacing old concrete floors— for-yourself" demonstration kit suppli quest by the manufacturer, The Maste Co., Cleveland 3, Ohio.

COLORED CONCRETE FLO FOR LIGHT TRAFFIC AREA

Colorcron is being widely used by co to obtain uniformly colored, long wear crete floors for show rooms, churches, apartments and offices; also for t rooms, patios, driveways, sidewalks, ways and garages. Floors can be score desired pattern.

Color Plus Long Wear

Colorcron floors cost less additional th ing the floor, outwear the best plain floor, and have more uniform and mor color than is obtained from the use ments put in the mix. Colors: light gr grey, red, brown, black, green, dark g non-colored.

Full directions for the use of Colorcro obtained from the manufacturer, The Builders Co., Cleveland 3, Ohio.

FOR NON-SHRINK GROUT

To avoid shrinkage—principal cause o in equipment grouts—plant engineers beco metallic aggregate, the material duces a flowable non-shrink grout.

Cross-section shows how an easily able flowable Embeco Grout cou shrinkage to produce full contact bedplate.

Following are a few of the many other Embeco non-shrink mortar: grouting bolts; grouting steel floor grids; around pipes through walls; caulking spigot pipe; patching floors, ramps forms.

A 16-page booklet of useful data and tion on the Embeco Non-Shrink Mo Grouting may be obtained from the turer, The Master Builders Co., Cle Ohio.

Contractors and Engineers

magazine of modern construction

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An index of articles published in CONTRACTORS AND ENGINEERS *during 1954 is available on request*

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Spotlight on highways

Since its announcement last July, President Eisenhower's proposal of a $101 billion 10-year highway improvement program has been the subject of a great deal of speculation among contractors, engineers, and others in the construction industry. Where will the money come from? Who will prepare the plans? How will the right-of-way be obtained? Can the contractors handle that much work? These are just a few of the questions that were asked.

Confidence in the program—in both the willingness of the public to finance it and the ability of existing agencies to plan and administer it—was firmly expressed in the policy statement issued by the American Association of State Highway Officials at its convention in Seattle last November. This statement, after indorsing the plan and offering full cooperation in the formulation of a program of action, recommends two operating principles which AASHO believes fundamental. The first is that federal funds for secondary, urban, and primary systems be continued; the second, that the cost of the interstate system be borne by the federal government, while planning, operation, maintenance, and policing remain the functions of the states.

These statements imply that the state officials feel they can continue normal improvement programs and still handle the design, planning, operation, and maintenance of a system of interstate highways to be built to freeway standards. This is undoubtedly the consensus of the organization, but it reflects an optimism not necessarily shared by all of the members.

The answer to the question of financing seems to lie in the recommendations of a five-man planning committee and in the subsequent action of Congress. There can be little doubt that the road users will pay the bill in the long run. The basic financing question seems to be one of raising sufficient money to get the program under way quickly, and then paying off the obligation over a number of years. Complicating factors are state and federal debt limits, statutory referendum requirements, and the competition for investment funds.

Uncertain as may be these other factors, there is no doubt on the part of contractors and the construction equipment industry that they can absorb the additional load. Bidding on recent toll-road jobs indicates that there are a large number of contractors available, equipped, and willing to undertake major highway-construction projects. The fact that bids have been going at less than engineers' estimates should quiet any fears of excessive construction costs for the accelerated program. THE END

NEWS AND VIEWS

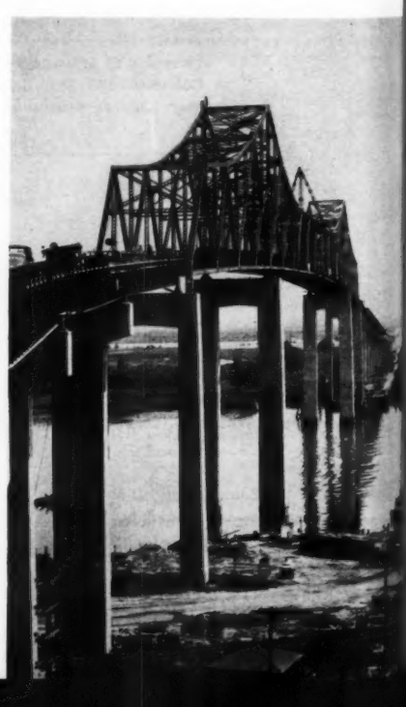
The gist of all year-end reports on the state of the construction industry emphasizes soundness and confidence. After a brief glance backward to note the record $52 billion worth of work done in 1954—$37 billion in new construction and $15 billion in maintenance—the annual construction review and outlook of the Associated General Contractors of America takes a plunge to predict a rise of $4 billion over this figure for 1955. Of this total—which would be the highest for any year—$40 billion and $16 billion are expected to be spent for new construction and maintenance, respectively.

A later report by Secretary of Commerce Sinclair Weeks speaks of "temperate optimism" regarding construction. And the National Constructors Association, though it does not expect "the record-breaking year anticipated by road builders," believes "another good year—better than 1954" to be in the offing.

All over the country, as if to bear out expectations, activity on all types of big projects is either underway or getting started. Next month, the $68 million new toll road in Oklahoma, running 89 miles from Tulsa toward Joplin, Mo., should go under contract in preparation for an early start. Financing is completed for another significant road job, the widening of the 118-mile New Jersey Turnpike from four to six lanes. The 18-month and $26 million project covers 83.3 miles of the road. Important to note here is the fact that the roadway, originally expected to carry 10 million vehicles during 1954, was used by nearly 25 million vehicles, a volume not expected for another 26 years.

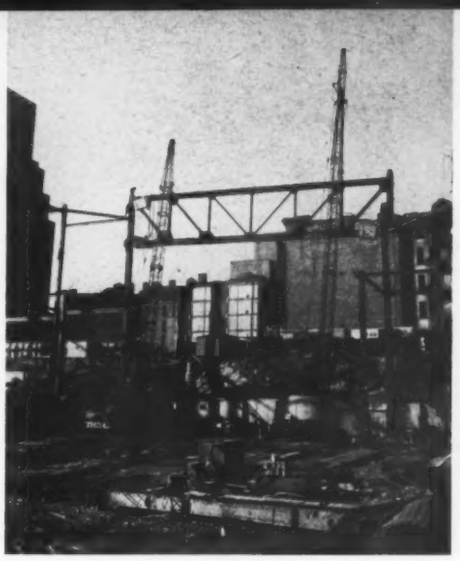
As with highways, the continued demand for offices, shopping facilities, and hospitals will aid building construction to register an increase over last year's substantial gain in construction put in place. Other types of work, and notably bridges and power projects, are dominated by a few huge jobs which have captured the imagination of builders. This year, which will see the bulk of work done on the Mackinac Straits bridge job, is also expected to mark the start of preliminary work on the bridge across The Narrows in New York. And cofferdam and bridge work are now going on for the St. Lawrence River power-development project—a job which should hit a good stride this summer after $200 million in contracts is awarded.

The new Eugene Talmadge Memorial Bridge across the Savannah River in Georgia, a 6,034-foot cantilever crossing with 135 feet of vertical clearance over the main channel, is the key structure in the $14 million 10-mile project which permits traffic to skirt the Savannah industrial area. Merritt-Chapman & Scott Corp. was prime contractor.



Wire guys brace truss set without horizontal bracing

Steel member has to be set first for New York Coliseum; truss will support portion of building providing bracing



A 30-ton truss, which will be braced only by wire-rope guys until regular framing is erected, is lifted into place between two steel columns at the New York Coliseum site. A P&H crane with 100-foot boom and a Lima 802 crawler with 110 feet of boom and a 20-foot jib make the lift.
C&E Staff Photo

Erection of a 30-ton steel truss without horizontal bracing—an unusual procedure—was completed last month on an unusual structure—the $35,000,000 New York Coliseum being built between W. 58th and 60th Streets at Columbus Circle. The 94-foot-long and 21-foot-deep member, which will form part of the exhibition hall ceiling of the coliseum, was set in place, between two columns, 84 feet above the ground. Wire guys were used to brace the truss, since part of the building which will eventually give horizontal bracing to the truss will be supported by the truss itself.

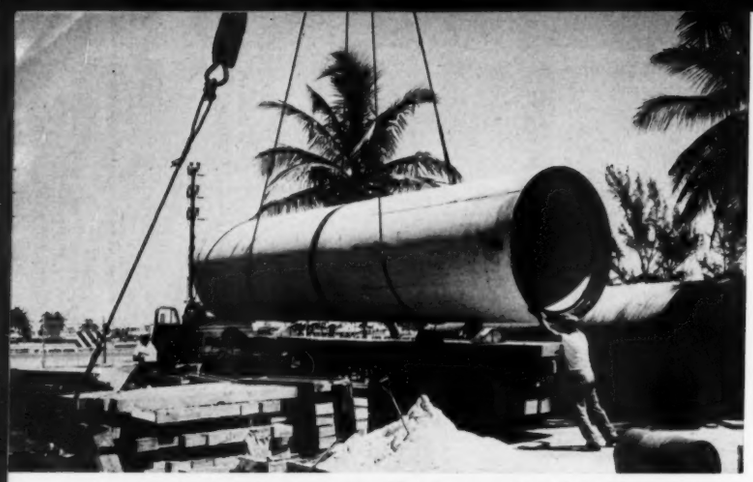
Designated T7 by the engineers, the truss was shipped to New York by rail from the Pottstown, Pa., works of the Bethlehem Steel Co. and assembled at the site. A P&H Model 555 truck crane with 100-foot boom and a Lima 802 crawler crane with 110 feet of boom and a 20-foot jib made the lift, one machine handling each end of the huge member.

As it was lifted into place, cover-plated steel columns, fastened to other structural steel, gave vertical support to the truss. At each side of the truss at the center line, two wire-rope guys were fastened to serve as temporary horizontal bracing. One was attached to the top chord and the other to the bottom chord. The ends of the two outside guys extending outside the building line were then fastened to a hairpin anchor embedded in a specially-constructed 6-ton concreted deadman at street level. The bottom end of the inside guys were made secure in the permanent column footings in the excavation. These wire-rope guys will provide the only bracing for the truss until regular framing is erected which will support the truss.

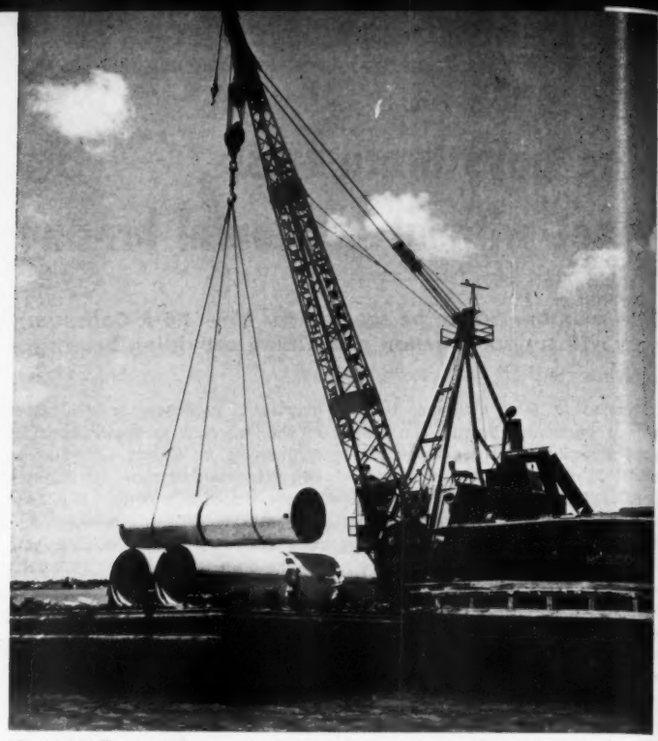
This truss, the first to be erected for the two-story convention hall, is one of 13 similar members which will go into the structure. Each of the other trusses, however, will be erected and braced in the usual manner. Altogether, a total of 13,000 tons of steel, including beams, columns, trusses, and girders, will be erected for the entire Coliseum structure.

Scheduled to be completed late in 1956, the Coliseum's four story exhibition hall will afford 225,000 square feet of unobstructed floor space for commercial exhibits and business shows. A huge stage will be contained in the main floor of the hall, which will have a seating capacity of 31,500. The hall itself, on the easterly half of the site, will take up 49 per cent of the 2 block tract. The remainder is given over to housing units, located toward Ninth-Columbus Avenues.

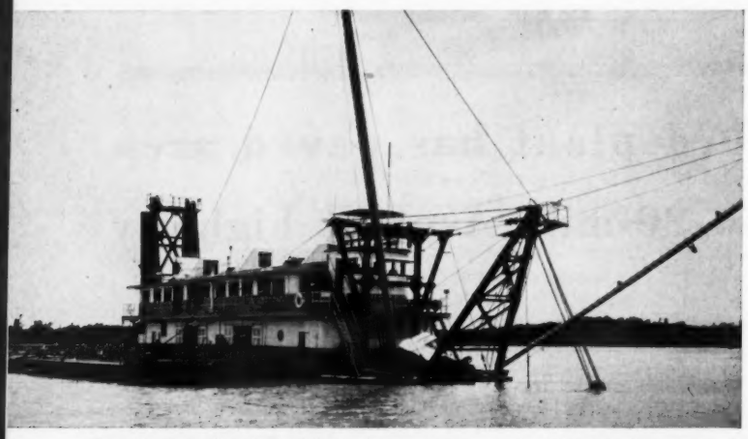
George P. Adair, Bethlehem's manager of erection for the New York district, is in charge of steel work on the project. A. C. Spallitta is field engineer; J. A. Stuart, superintendent. The Coliseum is being built by the Triborough Bridge and Tunnel Authority. Walsh-Fuller-Slattery, New York, N. Y., is general contractor on the project. THE END



A section of Universal concrete pipe, 32 feet long and weighing 32 tons, is set on a trailer in the Merritt-Chapman & Scott yard to be taken to the barge which plys between the shore and the site where the underwater force main is being laid. *C&E Staff Photos*



The M-C&S floating 75-ton crane, Cree, picks up a section of pipe from the barge. Each section, lowered beneath Biscayne Bay in wire-rope slings, is guided into place by divers.



The 16-inch dredge Hallandale works in a lagoon north of Virginia Key, piping fill material to the treatment-plant site. Altogether, more than a million yards of material was required for the plant, an access road, and the work site.

Huge sewer job requires varied pipeline work

Treatment plant, miles of interceptor, force main, and outfall pipelines comprise $27 million program

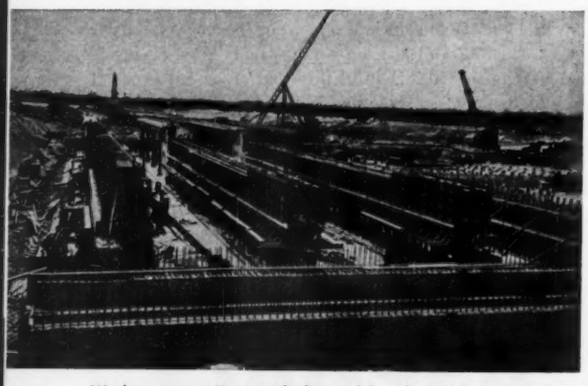
For diversity of construction, few projects now under way can equal the $27 million sewage treatment program of the City of Miami. Contractors from many parts of the country are engaged in building interceptor sewer lines, force mains, pumping stations, an underwater cross-bay pipeline, a sewage treatment plant on hydraulic fill, and an ocean outfall.

The five major contracts awarded thus far comprise the greater part of the work. Contract No. 1 calls for the construction of about 18 miles of interceptors and force mains to serve 20,000 acres of the city. Blythe Bros. Co., Charlotte, N. C., and W. T. Price Dredging Corp., Miami, were awarded the joint-venture contract for $6,700,000. The four main interceptors are mostly reinforced-concrete pipe, ranging from 8 to 78 inches in diameter and placed from 4 to 22 feet below ground.

The six pumping stations are being built by De Fonce Construction Co. Inc., Bridgeport, Conn., under a $2,450,000 contract. The two largest stations will have capacities of 50,000 and 60,000 gpm.

Contract No. 3 required the construction of a 72-inch force main nearly 17,000 feet long from Miami across Biscayne Bay to the grit chamber of the sewage treatment

This 12-foot-deep trench for an interceptor lane running several thousand feet along the edge of Biscayne Bay is kept virtually dry by wellpoints sunk into the porous coral.



Workmen erect Universal plywood-faced steel form panels for the sewage treatment plant. Approximately 14,700 piles, of both timber and concrete, are being used.

A Scoopmobile rides through the muck on Virginia Key, carrying some of the 11,000 timber piles to the driver. Timber piles are being used in cases where piles must be sunk below ground-water level; precast-concrete piles are used above ground-water level.

plant on Virginia Key. The big pipeline was laid in an excavated trench 15 to 28 feet below mean sea level. Merritt-Chapman & Scott Corp., New York, did the job for $2 million.

The high-rate activated sludge-type sewage treatment plant is being built by Paul Smith Construction Co., Miami, for $9,200,000. Present design will make the plant capable of handling 47 mgd, and provisions have been made for future expansion. The major structures include grit channels, flumes, aeration and settling tanks, chlorinators, sludge processing tanks, and incinerators.

Contract No. 5 was awarded to Diamond Construction Co., Savannah, Ga., for $1,600,000. The job requires the placing of an outfall pipe extending 4,490 feet into the ocean. Effluent will be dispersed through 12 ports in a multiple outlet. About 1,850 feet of the outfall will be 108-inch pipe and the rest 90-inch.

With the exception of the ocean outfall and the cross-bay pipeline, work on all other contracts was started late in 1953 and is expected to be completed late this year. Diamond Construction Co. began work on the outfall job late last year.

Interceptor Lines

Price-Blythe, joint-venture contractors on the 18 miles of interceptors, subcontracted all but 8 miles to three other firms. The subcontractors are laying mostly 48-inch and smaller pipe in residential areas, while the joint-venture contractors have taken on the tough 8-mile stretch of large-diameter pipe near downtown Miami.

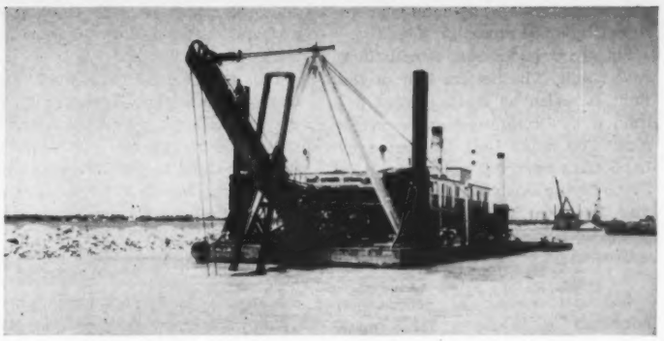
Subcontractors are using either ditchers or backhoes to excavate pipe trenches. Generally, cuts are made on the uphill grade so that the water falls back through the pipe to sumps. From here it is pumped into existing storm sewers.

In some areas, especially where the line follows close to the shore line of Biscayne Bay, wellpoints are proving to be the only way of reducing seepage and eliminating the need for shoring.

Wiley N. Jackson Co., Roanoke, Va., one of the subcontractors, had a particularly difficult problem on a line of 72-inch pipe. This was laid in a 12-foot-deep trench, only a few feet from the water's edge, that extended several thousand feet along Biscayne Bay. Jackson installed a wellpoint dewatering system between the trench and the bay. Holes 18 to 22 feet deep for the points were first augered into the porous coral with a Mobile drill mounted on the back of a truck. Points were placed every 2½ feet and connected to a 10-inch header pipe. One pump kept the water in the 12-foot trench down to a maximum 8-inch level, even though the bay was only a few feet away.

All reinforced-concrete pipe for the interceptor lines is being made by Universal Concrete Pipe Co., Columbus, Ohio, at a plant in Hollywood, Fla. Pipe sections are made mostly in 16-foot lengths. On relatively shallow trenches, one backhoe sets the pipe section as another pushes it into the joint. When a small pipe is placed in a deep trench, it is pulled into the joint by a wire-rope-and-ratchet device handled from the outside of the pipe. Large pipes in deep trenches are

(*Continued on next page*)



After 8 feet of material had been stripped from the bed of the bay by a hydraulic dredge, this 4-yard dipper dredge cuts a trench up to 28 feet deep for the underwater pipeline.
C&E Staff Photo

pulled into the joint by hand winches from inside the pipe.

Pipes are laid on a 6-inch-thick rock cradle. The bottom half of the joint is sealed by forcing grout behind a wire-reinforced gauze wrapping. The upper half is grouted by hand. This work will be completed by Price-Blythe this year. (See "Ditcher and Backhoe Team up for Sewer Job," C&E, Oct., 1954, pg. 74.)

Bay Crossing

Merritt-Chapman & Scott's job consisted of laying a force main across Biscayne Bay in a trench about three miles long. This work was completed last year.

The 72-inch underwater pipe was cast in 16-foot sections, then joined to make 32-foot sections. Price Bros. Co., Dayton, Ohio, did this work in a plant at Coral Gables, Fla. Then the big 32-ton sections were hauled on trailers to the M-C&S yard, which is set up on an island in the bay. The 50-ton derrick boat Crescent picked the heavy pipe sections from the trailers and placed them on a barge, which was towed out to the site.

The first of a long string of rigs working on the underwater pipeline was a 12-inch hydraulic dredge, owned by the Arundel Corp., Baltimore, Md., which stripped 8 feet from the bed of the shallow bay to provide a 220-foot-wide strip deep enough for floating the big derricks. Behind the hydraulic dredge, a 4-yard dipper dredge, also operated by Arundel, cut a trench up to 28 feet deep and deposited the material on one side.

The next rig in line was a rented stiffleg-derrick boat with a 2-yard bucket that laid an 18-inch crushed stone mat in the trench. Behind this, the Cree, a Wiley 75-ton revolving steam crane, lowered the 32-ton sections into the water with two wire-rope slings. The Cree was positioned to one side of the trench so that the crane could snub the spigot end of the lowered section into the bell end of the previously placed pipe. Divers gave directions by phone to the crews on the rig as the pipe was maneuvered into the rubber joint.

When the divers had checked the clearances around the joint, they anchored the sections together with a 3-foot bolt on each side of the pipe. Then they placed a 6 x 12 block under each end of the pipe and spiked 10 x 10 wedges against the sides. When the pipe was bolted and wedged in place, the slings were removed and the process started over again. During a good 5-day week, the M-C&S crew laid 800 feet of pipe.

Behind the Cree, a Koehring crawler crane mounted on a barge dumped stone which fell around and under the pipe to form a cradle. The pipe was later backfilled with the coral material that had been cast up by the dipper dredge.

Treatment Plant

The sewage treatment plant is now under construction near the north edge of Virginia Key, an island south of Miami Beach. Before the contractor moved in, the area was almost entirely a mangrove swamp without access from land or water.

When the Paul Smith Construction Co. began work last year, the first big jobs were to dredge a canal to the area for water transportation, build an access road, and carry water, electric, and telephone lines in from the causeway.

The access road was built primarily from materials dredged out of the canal and a nearby lake. About 120,000 cubic yards was removed from the canal to provide an 8 to 10-foot depth. Nearly 375,000 yards of fill for the road was acquired from the lake.

The plant itself required about 590,000 cubic yards of hydraulic fill spread over a 65-acre area cleared of all vegetation above ground. The contractor placed 45,000 cubic yards for his own work site. The 16-inch dredge Hallandale, operated by Arundel Corp., piped all of the material in from a lagoon area north of the island.

All structures are supported on piles driven to rock. Timber piles are used when the entire pile is below ground-water level, and precast-concrete piles are used above the ground-water level. The job requires about 11,000 timber piles and 3,700 concrete piles.

Concrete piles were precast on the site at the rate of 50 a day. Conventional steel side forms and wood soffits were used.

All concrete was ready-mix, batched on the site in a Fanning-Schuett plant. Aggregates were brought in by barge through the access canal and stockpiled by a Northwest truck crane. Bulk cement was hauled in 100-barrel Trailmobile carriers and elevated to the bin or the 750-barrel storage silo. Batches were hauled to the pour in Challenge mixers.

Wellpoints

Before starting on the first structures, the contractor ringed several areas with wellpoint dewatering systems. More than 3,000 linear feet of header pipe was used to service the points, installed mostly on 5-foot centers. The system worked very well, dropping the ground-water level 16 feet and permitting concrete work to be done in the dry.

Most of the structures are made of reinforced concrete. Prefabricated steel-framed plywood-faced form panels, designed and supplied by Universal Form Clamp Co., are used throughout. Concrete is placed with bottom-dump buckets handled by Northwest and Koehring cranes. A water cure is applied for seven days.

Design Features

The Miami sewage treatment plant will be a high-rate activated sludge plant having primary and secondary

treatment processes with separate sludge digestion and incineration facilities. The primary treatment process will consist only of grit removal; screening of the sewage will be done in Miami at the pumping stations.

Designs for the plant were based on an estimated 1964 population of 330,000 persons.

W. Fairfax is project manager for Price-Blythe, Capt. Crooks for Merritt-Chapman & Scott, and J. Y. Gooch for Paul Smith Construction Co. W. R. Boyd is resident engineer for Connel & Rader, supervising engineers for interceptors, pumping station, and bay crossing. B. W. Harig is resident engineer for Metcalf & Eddy, Boston, Mass., supervising engineer for the treatment plant and outfall. W. G. Glass is director of the Miami Department of Water and Sewers. THE END

◄ A Trailmobile unloads bulk cement at the Fanning-Schuett batch plant at the site of the sewage-treatment facility. The treatment plant, on Virginia Key, is being built by Paul Smith Construction Co., Miami.

C&E Staff Photo

Pryke Heads New York Consulting Engineers

New president of the New York Association of Consulting Engineers is John K. M. Pryke, principal and owner of the firm of Slocum & Fuller, New York, N. Y. He succeeds Burnside R. Value of the firm of Seelye, Stevenson, Value & Knecht, also of New York.

Other new officers include V. L. Falotico and Peter J. Reidy, vice presidents; John O'Keefe, secretary; and Harry H. Bond, treasurer.

An engineering graduate of London University, Mr. Pryke joined Slocum & Fuller in 1945. He became principal and owner in 1949. He is a licensed professional engineer in the state of New York.

Crow Construction Co. Marks 115th Anniversary

One of the oldest contracting firms in the country, the William L. Crow Construction Co., New York, N. Y., last month celebrated its 115th year of business under the management of the Crow family.

Organized in 1840 by Langstaff N. Crow, the company today is headed by William L. Crow, great-grandson of the founder. Ralph L. Crow, a brother, is vice president.

Well-known projects constructed by the company include the Vanderbilt Hotel in New York City, the Westchester County Office Building at White Plains, N. Y., and the Drexel-Morgan offices in New York. Currently, the firm is completing the Seaman's Bank for Savings in New York and, in partnership with two other companies, Wheelus Field airbase in Tripoli. The latter project is the first the company has undertaken on foreign soil.

Continental Copper Buys All of Wooldridge Stock

Joining the trend toward consolidation, Wooldridge Mfg. Co., Sunnyvale, Calif., has sold its entire stock to Continental Copper & Steel Industries, Inc., New York, N. Y.

Wooldridge, founded in 1938, manufactures scrapers, bulldozers, rippers, Terra Cobra earthmovers, and other types of earthmoving equipment. The company will be operated as a division of Continental Copper & Steel.

Through the purchase, Wooldridge manufacturing facilities in the west will be at the disposal of CCS divisions, facilitating service to western markets. Eastern facilities of Continental will similarly be available to Wooldridge. The arrangement will provide a more adequate coast-to-coast service for the combined activities of Wooldridge and Continental.

Marion-Osgood-General Names Sales Manager

The appointment of Kenneth O. Williamson as Marion-Osgood-General sales manager has become effective. He will concentrate his activities on the sale of the company's 4-cubic-yard and smaller sized machines through distributor organizations in the United States and Canada.

Mr. Williamson was formerly associated with the Osgood Co., which became a Marion Power Shovel subsidiary last year.

MONEY MATTERS

By WILLIAM HURD HILLYER

Tempering the growing optimism in construction financing are warnings that this year—as last year—the unexpected may occur. A glance at current unfavorable trends in the construction money market shows, however, that such a pessimistic view is largely unjustified.

When water flows uphill, or money moves in a contra-normal direction, that's news. When life insurance companies (those great reservoirs of liquid capital) begin borrowing from banks, that's headlines. True, neither the companies nor the banks call it borrowing. The Prudential Insurance Co. of America has a new arrangement with some 160 banks for "warehousing" large blocks of VA and FHA mortgage loans that it buys. Its current total of $350 million falls into this category. In plain language, here is what happens: the banks put up the money for these mortgages and "carry" them on the Prudential's promise to pick up the loans not later than June 30, 1956. As is plain, these banks are really lending Prudential a huge sum so it can make more residential mortgage loans.

Deals like this will have an adverse effect on heavy construction because:

1. Big institutions—normally liberal buyers of municipal and public works securities—have a great deal of money on loan and are enlisting the help of banks to take care of residential mortgage demands.

2. The banks in turn are "warehousing" insurance-sponsored mortgages with money that would otherwise be seeking investment in state, county, authority, and corporate bonds for constructive improvements.

Without presuming to pass upon the economic soundness of such operations, they may be noted as brakes upon a rising feeling of optimism.

To be sure, the mortgage market may be more stabilized when the Federal National Mortgage Association gets another $500 million with U. S. Treasury sponsorship, but this will be at best a revolving fund, not much more sizable than that warehoused by the Prudential's banks.

Two proposals for Congress to consider are designed to make construction financing easier. The first measure would let commercial banks buy toll-road bonds on an underwriting syndicate basis. Under the second proposed law, national banks could make 9-month construction loans. Though "odds favor enactment" of both these measures, according to banking correspondents in Washington, a few nudges to your congressman on this score would do no harm.

Another favorable development is the incorporation in New York State of the country's first "joint mutual investment fund" for smaller banks. It will provide a pool of expertly selected legal securities in which the junior-sized banking world may participate. "Legals" in bond parlance are mostly municipal and similar obligations. A fresh source of heavy-construction money should thus become available when counterparts of this "Bank Fiduciary Fund", sponsored by the Trust Division of the New York State Bankers Association, spring up across the nation. On the federal level, measures which will aid construction include the creation of a $19 billion government corporation to finance highways.

Public construction may be spurred by programs designed to expand state colleges, mental hospitals, and related facilities. One of the foremost of these programs—involving nearly half a billion dollars—is now being studied by a committee of California state authorities. Increasing official approval for these public works is evidenced by the belief that voters will approve the necessary bond issues early in 1956. Bankers, however, are exercising greater watchfulness regarding the current spate of thruway bonds, if a semaphore set up by the supervising examiner of the Federal Deposit Insurance Corporation is indicative.

The municipal bonds market is giving a good account of itself, despite heavy absorptions recently—a third of a billion dollars in New York State Power alone. Qualified authorities incline toward favorable predictions for this market during the first half of 1955 at least. Banking authorities concede that there will be "digestive periods" from time to time, but affirm that the steady accumulation of savings will take care of absorptions, provided present conditions are not radically disturbed.

A good year is felt to be in the offing by New York's largest bank, which views 1955 as "more active" and "more competitive" than 1954. Many of last year's stabilizing influences are expected to continue,

however, and the word "optimistic" may be used to describe the outlook for 1955, according to that institution's annual report to its stockholders.

Lending support to this view are a number of factors:

1. Wholesale prices, fairly stabilized, are only 5 per cent above the 1948 level, the Bureau of Labor reports.

2. The Federal Reserve's boosting of stock margin requirements to 60 per cent should curb excessive speculation and prove a steadying influence on the economy.

3. Accumulated per capita savings are at an all-time high, despite a national third-quarter dip. In New England, says the Federal Reserve Bank of Boston, these savings already stand at about $1,900.

4. In a coast-to-coast survey, 187 leading banks which account for a third of all U. S. business loans report their customers are "planning to produce more" and to "sell more" in the months ahead. Here the emphasis is on public utilities, transportation, and the construction industry in general.

5. Bank check clearings, a good index of business activity, are running ahead of 1953, with January gains touching nearly 20 per cent.

6. Further increases in consumer earnings and expenditures are expected this year by those in banking.

The financial world is reasonably certain, according to a major New York trust company's latest pronouncement, that "1955 will be a better year than its predecessor." Skilled business analysts, reporting to their banking associates, take the view that business volume will be larger this year than last. This makes it almost certain that there will be marked rises in both new state and new local construction.

Microwave Radio Systems For Highway Department

Two separate microwave relay systems for the Department of Highways of the State of Washington are being built by the Radio Corp. of America, New York, N. Y. One system will provide a VHF control circuit linking Port Angeles, Bellingham, and the department's Orcus Island VHF base station on top of Mount Constitution. The second system will provide point-to-point communication between Walla Walla and Pasco.

Dump-Truck Bodies And Hydraulic Hoists

■ Galion Allsteel dump-truck bodies with lengths of 8 to 10 feet, and hydraulic hoists with ratings ranging from 6½ to 9 tons, are covered in a new catalog. The folder illustrates the Model 12N-3 bodies and Models 600, 700, and 710 hydraulic hoists with action photos, line sketches, and cutaway views. Construction details and mechanical features are discussed, and full specifications are included.

To obtain this literature write to the Galion Allsteel Body Co., Galion, Ohio, or use the Request Card that is bound in at page 18 of this issue. Circle No. 288.

Buy a Defense Bond Today!

Too Many Judges

To the Editor:
Contractors & Engineers

In "Avoid Legal Pitfalls" by A. L. H. Street on page 70 of the December issue, the ruling in the case of Broderick v. Cauldwell-Wingate Co. was referred to as a "narrow decision; three of the seven judges dissented."

As I was the counsel for the subcontractor in that case, I must inform you that your statement was incorrect. The decision you refer to was made by the Supreme Court of the Appellate Division, Second Department, where only five judges sit to pass upon an appeal. Two of the judges had dissented but you did not observe that the case was appealed further to the Court of Appeals of the State of New York where there are seven judges. The split decision of the Appellate Division was unanimously affirmed by the Court of Appeals 305 N. Y. 872.

Yours Very truly,
Emil V. Pilz
Nevius, Brett & Kellogg
New York, N. Y.

Editor's note:

Counselor Street agrees that he mistakenly referred to a "three-to-four" decision in the Appellate Division, instead of the actual three-to-two decision. The unanimous affirmance by the Court of Appeals escaped his attention because there was a mere order of affirmation without opinion or discussion of the points involved. The significant fact to which Mr. Pilz draws attention is that all seven judges of the Court of Appeals—the highest court in New York—approved the conclusions of the three judges of the Appellate Division who disagreed with their two fellow judges.

Earle R. Evans Dies; McKiernan-Terry Officer

Earle R. Evans, vice president of the pile hammer division of McKiernan-Tery Corp., New York, N. Y., and a director of the firm, died last month at North Shore Hospital, Manhasset, Long Island.

A graduate of the University of Illinois, Mr. Evans was employed by Worthington Corp. before serving with U. S. forces in World War I. He joined McKiernan-Terry 35 years ago, following his release from military service. He was a member of the American Society of Mechanical Engineers and The Moles.

Road builders are ready for $101-billion program

ARBA, at its 53rd annual convention, reports on plans, materials, manpower, and equipment for a 10-year highway program

President Eisenhower's proposed 10-year $101-billion highway-construction program was the theme of the 53rd annual convention of the American Road Builders' Association held last month at the Roosevelt Hotel, New Orleans, La. On January 13th, last day of the four-day meeting, the delegates heard a report on the ability of the engineering profession and the construction industry to plan, design, and execute this "grand plan". According to the four task forces that presented the results of their surveys—covering the availability of plans, materials, manpower, and equipment—the road building industry is ready and able to handle what would be the country's greatest peacetime public works program.

Over 1,000 highway officials, engineers, contractors, material suppliers, equipment manufacturers, distributors, insurance and finance specialists, educators, and the trade press—representing all segments of the construction industry—attended the meeting. For the first time at its convention, the ARBA presented an exhibit of highway materials and supplies. The 57 exhibitors displayed their wares in the International Hall of the convention hotel. Included in this showing were such products and services as surveying and drafting instruments, aerial surveys, tire recapping, insurance, pipe, piling, pavement joints, reinforcing, curing paper, wire rope, cement, concrete-saw blades, oil, two-way radio, salt, calcium chloride, laboratory testing equipment, slag, bridge and guard-rail, signs, and bituminous additives. In addition to the industrial exhibits, there were displays by the Army, Navy, Air Force, Bureau of Yards and Docks, the Louisiana Department of Highways, and the New Orleans Department of Streets.

New Officers

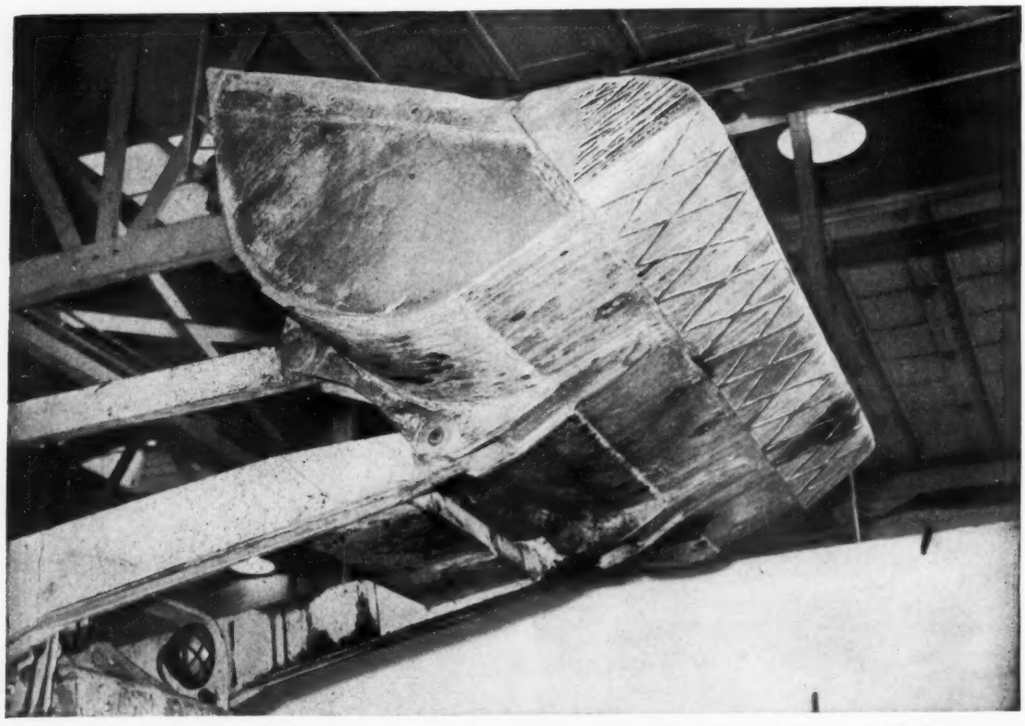
ARBA's 1955 president, John N. Robertson, assumed office at the convention. The Director of Highways, District of Columbia, Washington, D. C., he succeeds Robert M. Reindollar, consulting engineer and former chairman of the Maryland State Roads Commission. The four new vice presidents are: northeastern district, Charles M. Noble, New Brunswick, N. J.; southern district, Charles W. Smith, Pensacola, Fla.; central district, Julien R. Steelman, Milwaukee, Wis.; western district, George T. McCoy, Sacramento, Calif. Jennings Randolph of Washington, D. C., was re-elected treasurer.

New directors include: John T. Moss, Leeds, Ala.; George H. Kimber, Washington, D. C.; Ben H. Petty, Lafayette, Ind.; O. W. Merrell, Columbus, Ohio; W. B. Greene, Aurora, Ill.; A. L. Burras, Nashville, Tenn.; and George M. Foster, Lansing, Mich.

The materials and supplies division of ARBA named J. E. McCracken, Bethlehem, Pa., chairman, and E. W. Bauman, Washington, D. C., vice chairman. In the contractors division, L. W. Lamb of Holland, Mich., was elected president. The county and local roads division chose Allan M. Williams, Ionia, Mich., as its president. T. J. Montgomery of Cincinnati, Ohio, was named president of the municipal and airport division. In the educational division, Calvin G. Reen, State College, Pa. was picked for president. Frederick Salditt is president of the Construction Industry Manufacturers' Association of ARBA. He is vice president of Harnischfeger Corp., Milwaukee, Wis. Lt. Gen. Eugene Reybold is executive vice president of ARBA.

Voices of Congress

Convention speakers included five members of Congress—two senators and three representatives—Sen. Francis Case (R-S. Dak.), ranking minority member of the Senate subcommittee on roads; Sen. Dennis Chavez (D-N. Mex.), chairman of the Senate committee on public works; Rep. George H. Fallon (D-Md.), chairman of the House subcommittee on roads; Rep. J. Harry McGregor (R-Ohio), ranking minority member of the House subcommittee on roads; and Rep. Jesse P. Walcott (R-Mich.), ranking minority member of the House committee on banking and currency.

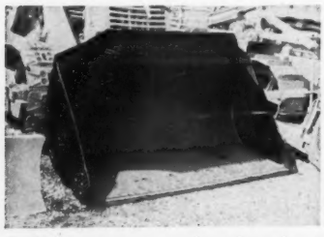


Hard-faced with Stoody 21 along the lip and side plates, this scoop holds size and load capacity. A self-sharpening lip makes it easy to load.

PROTECT THE LIP AND SAVE THE SCOOP —A simple Stoody hard-facing procedure for loaders

Protecting scoop loaders from wear is a relatively simple hard-facing job. Results are generally two-fold; 1) The bucket holds original size, thus retaining full capacity and 2) lips become self-sharpening, insuring easier loading.

MANY TYPES—Although many scoop loaders are manufactured today, hard-facing procedures are similar on all. Wear usually concentrates along the bucket lip and extends up both inner and outer sides of the end plates. (Caution: Hardened steel lips as furnished by some manufacturers are not suitable for welding until surface hardening has been worn through.)



End plates are protected inside and out with a series of parallel stringers or cross-hatched beads of Stoody 21.

HARD-FACING DETAILS—A single ¾" wide band of Stoody 21, along the top edge of the lip, accomplishes two purposes:

It provides maximum wear protection for intense scuffing and abrasion against earth, paving materials, etc.

It makes the scoop self-sharpening by keeping the top surface from wearing as rapidly as the base metal.

End plates are hard-faced by a series of parallel or cross-hatched stringers, both inside and outside and along the leading edge.

Replace severely worn lips with steel plate cut to size and hard-face as described above.

Stoody 21 is suggested for protecting scoop loaders because of its high abrasion resistance and impact strength. These two features are a direct result of high alloy content—yet Stoody 21 is a low cost electrode. This and other equipment-saving applications are described in the Stoody Guidebook. Ask your Stoody dealer for a copy (consult the "Yellow Pages" of your phone book) or write direct.

The scalloped edge on this scoop is a variation that has been found to give excellent results under some conditions. Note the hard-facing material along the edge.

Rep. McGregor told the convention that the proposed 10-year highway program "would be more than double what we are now doing through the federal, state, county, and municipal governments." The representative remarked that he expected President Eisenhower's program would receive constructive action in this Congress, but cautioned the delegates against assuming that Congress will enact without modification the exact recommendations of the President. Speaking of the anticipated appropriations, he advised the "use of this money for highways—not politics". Rep. McGregor also reminded delegates that "competitive bidding gives more and better miles of highways than paying political obligations in the form of force-account road construction".

None of the Congressional speakers presented any specific recommendations for financing this "grand plan". Rep. McGregor mentioned one suggestion which holds that since roads are a capital asset, "the federal share of interstate construction be financed by long-term bonds, probably issued by a corporation—possibly a federal highway corporation created for the purpose by this Congress".

Rep. Walcott said that he was at a loss to explain how this road-building program could be financed, and that there had been too much superficial thinking on the subject. He added, however, that the United States should find the ways and means of financing this plan since the country has always managed to raise billions for credit and loans to foreign countries.

Rep. Fallon admitted that the problem of financing the 10-year program of accelerated construction will require searching Congressional examination. He reminded the road builders that the new Federal Aid Act, which becomes a law in July, contains for the first time "a provision that all highway construction under the act shall be performed by the contract method".

Sen. Chavez remarked that so far President Eisenhower and others connected with the highway program have spoken only in generalities. He said that he expected, however, to hear some details when the President gave his special message to the Congress on Jan. 27th.

Sen. Case declared that a major problem in the program will be to demonstrate that the completion of the interstate system will not delay or interfere with the building of badly-needed roads on the primary, secondary, and urban systems that are not a part of the interstate route. "There are two answers to this question," he explained: "first, that relieving the states of matching funds on the interstate system will release funds for construction of other systems; second, that the reimbursement for funds already spent on the interstate system will make possible some for 'lieu' roads in neglected sections".

Task Force Reports

Before the ARBA presented the reports of its four task forces on the capability of the industry to handle the 10-year road program, H. A. Radzikowski of the Bureau of Public Roads, Washington, D. C., discussed the nation's highway requirements. The BPR maintenance chief read parts of the report of President Eisenhower's Highway Commission, headed by Gen. Lucius D. Clay. The report recommended that, in the proposed program, the federal government furnish 30 per cent of funds and the remaining 70 per cent be furnished by state, county, and city governments. Radzikowski revealed that a breakdown of the $101 billion for the "grand plan" earmarked $36 billion for urban expressways and local streets; $33 billion for primary roads; and $32 billion for secondary and other local roads. It is estimated that a third of this work will be surface construction, almost a third grading, and almost a quarter bridge construction.

The condensed versions of the four reports presented covered "Planning and Design" given by Prof. Ben H. Petty of Purdue University; "Materials and Supplies" by A. T. Goldbeck of the National Crushed Stone Association; "The Construction Industry" by S. Howard Brown of Brown, Davis & White Construction Co., Grantville, Pa.; and "Construction Machinery and Equipment" by Frederick Salditt, Harnischfeger Corp., Milwaukee, Wis.

The salient features of the reports, based on extensive surveys and made with the cooperation of the Bureau of Public Roads, were summed up by Hal G. Sours, a Columbus, Ohio, consulting engineer and past president of ARBA. Sours disclosed that there is now a backlog of about $16 billion in construction plans ready or being prepared. This should provide an effective start on the $101-billion 10-year road program. Expenditures would total $6 billion in 1955, the first year of the program, as compared with $4 billion in 1954. For the second, third, and fourth years, the expenditures would total $8, $10, and $11 billion, respectively. The remainder of the 10-year program calls for $11 billion to be spent each year on roads.

An intensified recruiting program is needed to obtain newly graduated engineers for the highway program. Better utilization of engineers through reassignment of more routine work to sub-professional employees will furnish some relief. Greater use of aerial photogrammetric surveys promises aid.

No materials and supplies shortages were found which could not be overcome by production-plant expansion when firm orders for materials are offered.

Surveys show that contractors now handling the bulk of $4-billion worth

of highway construction are operating at 46.4 per cent of capacity. Shortage of equipment operators can be avoided by training additional personnel before the maximum program level is reached. The expansion of the road program will attract contractors not now engaged in highway work.

As for equipment, at present some 300,000 major units of construction machinery are available. The maximum additional requirements for a single year are 92,000 units. The current rate of equipment manufacture by the construction machinery and allied equipment industry varies from 33 to 67 per cent of peak capacity, depending on the product. After considering the requirements of highway maintenance and other construction claimants, the industry is confident it can meet the high-level needs of an expanded highway-construction program.

Thus ARBA finds that not only are the engineering profession and the highway industry ready to undertake the proposed program, but that such a program is well timed in view of the additional work capacity which now exists.

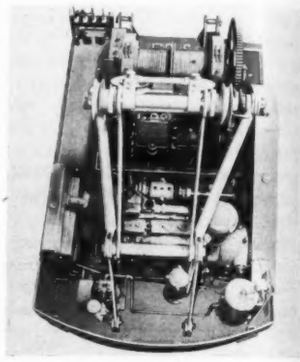
THE END

Excavator Has Features For Lifting Crane Service

■ A new 2-yard shovel with a 60-ton rating as a lifting crane has been announced by the Marion Power Shovel Co., Marion, Ohio. The machine also converts easily in the field for dragline, clamshell, or pull-shovel service.

The new 83-M excavator has special design features for crane service. A third drum, available for handling piles or snaking-in or snubbing loads, enables the machine to operate as a high-speed boom hoist. The machine has a high retractable and self-raising gantry which is raised or lowered under power in a matter of minutes. An independent boom hoist, available optionally, provides power up and down and uses machinery power instead of a brake to control lowering of the boom.

For extra stability in crane service, the crawler width of the Model 83-M



Machinery deck of the new Marion 83-M shows drum, clutch and independent propel shafts, and power unit, arranged for easy accessibility.

can be spread to 12 feet 11 inches, and extra-long 19-foot crawlers are available. The crane boom is of the goose-neck type which allows heavier and bulkier loads to be handled closer to the machine. Large loads can also be lifted higher than is possible with an open-throat boom.

An important mechanical feature is the use of the torque converter as standard equipment. The device reduces shock to machinery and gives the operator as much operating speed as the load will permit, within the horsepower limits of the engine.

Marion air control eliminates the need for levers, bell cranks, toggles, and pins on the Model 83-M. The operator applies only 12 pounds of hand pressure on compensating-type air-control valves to release the machine's full power.

For further information write to the company, or use the Request Card at page 18. Circle No. 397.

F. H. McGraw to Rebuild North Church Steeple

The rebuilding of Boston's North Church steeple—which was toppled last year by Hurricane Carol—is being undertaken as a public service by F. H. McGraw & Co., New York City engineering and construction firm.

Work on the job is expected to begin early this spring. Although the five-month reconstruction job will not be completed by April 19, certain dedication ceremonies may be held on that date—the anniversary of Paul Revere's midnight ride.

The firm, striving to make the rebuilt steeple an exact duplicate of the original, has completed the necessary historical research for the project. One of the most difficult material items required for the work is four white oak beams each 46 feet in length, which will serve as main structural members in the steeple. To date, several building-materials manufacturers have offered to donate materials for the steeple, and McGraw is accepting these offers, wherever possible, in an effort to hold down costs.

The project is being financed by contributions.

HRB annual convention reviews research work

Virtually every detailed phase of highway building and operation came under scrutiny last month during the 34th annual meeting of the Highway Research Board in Washington, D. C. A record number of technical papers and research reports—some 200 in all—were presented in four days of sessions attended by an estimated 1,000 interested persons.

As in previous years, large portions of the program were given over to the airing and discussion of problems and projects relating to construction and maintenance. Although almost every conceivable aspect of these subjects was treated, particular emphasis was laid this year on such matters as subgrade preparation, the design and preparation of asphaltic pavement mixtures, and the prevention and repair of reflection cracking in bituminous resurfacing.

Engineers and other officials of state highway departments throughout the country were in attendance, as well as research men from various public and private organizations, agencies, and educational institutions. A number of foreign countries also were represented.

Chairman G. Donald Kennedy set the tone for the meeting in his address at the opening general session. Describing the immediately past year as the most important to date in highway research, he went on to urge "a redoubling of our efforts" to meet the challenge of President Eisenhower's proposed $101-billion highway program. "This 10-year construction program demands that we increase our research for the best methods and materials to be used in designing, constructing, maintaining, and operating our vast system of highways," he declared.

Projects for 1955

Specific research projects the chairman recommended for special stress during 1955 were:

1. Reduction of expenditures for highway maintenance.
2. Expansion of the scope of each state highway department's planning commission.
3. Economic studies.
4. Correlation of rail and highway transportation.
5. Assumption of leadership in the battle against highway deaths.

In extending his greetings to the assembly, Detlev W. Bronk, president of the National Academy of Sciences (parent organization of the HRB), called for research into the problems—particularly those of safety—created by highway traffic. "If you disregard this human element," he pointed out, "you disregard the primary purpose of an engineer; the only purpose of a machine, after all, is to extend the natural powers of man."

Annual Awards

Three state highway department men, a university professor, and an official of the American Automobile Association were cited during the annual presentation of awards. Four of the recipients were present for the ceremony, while one award was presented posthumously.

The Roy W. Crum Distinguished Service Award, presented each year for "distinguished public service in the search for and application of scientific knowledge" in the field of highway technology, this year went to three men: Ralph A Moyer, professor at the University of California's Institute of Transportation and Traffic Engineering; Burton W. Marsh, director of the Traffic Engineering and Safety Department of the American Automobile Association; and the late Walter H. Root, chairman of the Highway Research Board and deputy chief engineer of the Iowa State Highway Commission at the time of his death last April.

The George S. Bartlett Award for outstanding service to highway progress, conferred jointly by the American Association of State Highway Officials, the American Road Builders' Association, and the HRB, went to James A. Anderson, commissioner of the Virginia State Highway Commission. The annual award for the best paper presented at the previous annual meeting was presented to Claude A. Rothrock, planning engineer for the West Virginia State Highway Department, for his report on "Urban Congestion-Index Principles."

Another highlight of the opening day's general session was the showing of a film detailing the layout, construction, and testing procedures of the WASHO road test project in Idaho. William N. Carey, Jr., a representative of the Highway Research Board who spent considerable time observing the western road test, prefaced the film with an announcement that results of the test are expected to be published sometime this year. Field work at the test site was com-

pleted last fall, and engineers are now engaged in tabulating and correlating the findings.

Report Sessions

The remainder of the annual meeting was devoted to smaller sessions on specialized aspects of highway traffic; economics, finance and administration; design; materials and construction; soils; and maintenance. Thirty-eight such technical sessions were held. Sixty-two business meetings of HRB committees also were held during the four-day conclave.

Subjects of special interest to engineers and contractors were treated under the general headings of design, soils, materials and construction, and maintenance. In the field of design, papers discussed both bituminous and portland-cement concrete pavements, bridges, culverts, and roadside development. Soils sessions featured reports on compaction, loading, soil stabilization, sand drains, soil cement, frost penetration, and various moisture conditions. Highlights of the materials and construction sessions were papers dealing with aggregates for bituminous mixes, testing of mixes and sealing materials, and the methods of mixing both portland cement and asphaltic concretes.

Meetings devoted to maintenance covered a variety of subjects, but special interest centered about the resurfacing of portland cement concrete pavements with asphaltic concrete. Several papers considered the problem of reflection cracks in this blacktop surface coat.

All papers presented during the annual meeting will be published by the Highway Research Board during the coming year. THE END

Mechanical, Electrical Equipment for Buildings

The selection, installation, operation, and maintenance of electrical equipment for buildings is comprehensively treated in a third edition of "Mechanical and Electrical Equipment for Buildings", published by John Wiley & Sons, Inc., New York, N. Y.

In this revised and expanded edition, there is a new chapter on radiant heating and a simplified chapter on ac and dc machinery.

The book is divided into sections, which cover water supply, sanitation, air conditioning, electrical equipment, and acoustics. Charts, diagrams, and photographs are used profusely to illustrate the text of the 564 page book. Priced at $8.50, the book may be ordered from the publisher, 440 Fourth Ave., New York 16, N. Y.

Protection of Buildings Against A-Bomb Damage

The timely subject of protective building design in an age of A or H-bomb threat is treated in a new book, "The Bomb, Survival and You," published by Reinhold Publishing Corp., New York, N. Y. Written by a distinguished engineer and a professional journalist, the work is a practical exposition of bomb-versus-building data.

The authors discuss the problem posed by the threat of nuclear attack and the known effects of such attack on a wide variety of structures. Subsequent chapters treat the theory and practice of shelters, the strengthening of existing structures, design of windowless buildings and other structures able to resist atomic blast, fire and blast resulting from an atomic burst, and other pertinent subjects. Such technical aspects as instantaneous overloads of tremendous but brief force, dynamic design, and the peculiar vulnerability of wood, steel, and concrete are treated in detail.

Besides 31 line drawings, the book contains 16 pages of photographs depicting bomb damage to buildings at Hiroshima and Nagasaki. The photograps were only recently released by the military security organziation, and are available to the public for the first time in this book.

Fred N. Severud, senior partner in a consulting engineer firm and widely experienced civil engineer, and Anthony F. Merrill, former Washington press correspondent and free-lance writer, are the authors of "The Bomb, Survival and You."

The book is priced at $5.95, and may be ordered from Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y.

Air and Electric Hoists For Material Handling

■ A full line of air electric hoists for handling bulk materials of all types is described in a catalog from Ingersoll-Rand, 11 Broadway, New York 4, N. Y. The hoists are recommended for many lifting, pulling, loading, and scraping operations involving material transfer.

Single, double, and triple hoists are illustrated. Details are given on drum lengths, frame construction, and motor types. The booklet also has descriptions of two types of remote-control units, throttle equipment, and several types of brakes.

To obtain Form 5300-A write to the company, or use the Request Card that is bound in at page 18 of this issue. Circle No. 384.

DISTRIBUTOR DOINGS

Lawrence P. Deephouse, president of the New England Equipment Distributors Association.

Needa Elects Deephouse

The New England Equipment Distributors Association has elected Lawrence P. Deephouse to serve as president of the association. President and treasurer of Deephouse Equipment Co., Berlin, Conn., he has been a director of Needa since 1950.

A mechanical engineer, Mr. Deephouse is a member of the Connecticut Society of Civil Engineers, Connecticut Association of Street and Highway Officials, and the Hartford Engineers Club.

Other officers elected were: T. G. Milton, Perkins-Milton Co., Inc., South Boston, Mass., vice president; H. S. Schwartz, New England Construction Co., Boston, Mass., secretary; and Ralph Mulkerin, Builders' Equipment & Supplies, West Medford, Mass., treasurer. Also elected were four directors: T. B. Holmes, Holmes-Talcott Co., Hartford, Conn.; Bernard Gorman, Tractors, Inc., Providence, R. I.; Charles Belisle, Nobel-Belisle Machinery, Inc., Lebanon, N. H.; and Robert Linberg, Eastern Tractor & Equipment Co., Portland, Me.

Chain Belt Co. Names Two Midwest Dealers

The Gibbs-Cook Equipment Co., 1314 Walnut St., Des Moines, Iowa, and Stockberger Machinery, Inc., 1630 High St., Fort Wayne, Ind., have been appointed exclusive dealers of Rex construction machinery by the Chain Belt Co., Milwaukee, Wis.

Central and northern Iowa constitute the territory of Gibbs-Cook, and Stockberger will handle the entire state of Indiana. The Indianapolis and South Bend branches of the Stockberger organization will also handle Rex Moto-Mixers, Speed-Primer pumps, and the Rex line of mixers and pavers.

Case Dealer for N. J.

A distributor franchise covering northern New Jersey has been granted to Dale & Rankin, 23 Sussex Ave., Newark, by the J. I. Case Co., Racine, Wis. The company will handle the Case line of tractors

Detroit Diesel Engine Names New Dealers

Complete factory-approved sales and service facilities have been established by the Detroit Diesel Engine Division of General Motors Corp., Detroit, Mich., for the Columbus Equipment Co., Columbus, Ohio.

From its headquarters at 50 E. Kingston Avenue, the company will serve as industrial distributor of GM diesel engines in the Columbus area.

T. E. Potts Equipment Co., Buffalo, N. Y., has also been appointed a distributor for the division, and will offer factory-approved sales and service for customers in the Buffalo sales area. The company has headquarters at 2260 Sheridan Drive.

Detroit Diesel has also appointed the Cunningham-Ortmayer Co., Milwaukee, exclusive dealer in Wisconsin.

Buck Equipment Promotes

The Cincinnati, Ohio, firm of Buck Equipment Corp., has promoted Ralph J. Chrobak to the post of general sales manager. He was formerly a sales engineer with the firm.

After his discharge from the U. S. Army Transportation Corps, Mr. Chrobak operated a heavy earth-moving company and later headed the spare parts and vehicle shipping department of the Cadillac Division of General Motors.

Ralph J. Chrobak.

(*Continued on next page*)

(Continued from preceding page)

Heil Dealer in California

General Truck Equipment Co., 2699 Atlantic Ave., Long Beach, Calif., has been appointed by the Heil Co., Milwaukee, Wis., as distributor of Heil dump bodies, hydraulic hoists, and Heiloader hydraulic elevating tailgates in southern Los Angeles County.

New Dealer for Le-Hi

The Durrie Sales Co., Chicago, Ill., has been appointed by the Hose Accessories Co., Philadelphia, Pa., as sales representative in the Illinois, Indiana, and Iowa marketing areas.

From its headquarters at 605 W. Washington St., Durrie will distribute the company's Le-Hi line of hose couplings, valves, and accessories.

Traveling P&H Schools Visit Excavator Dealers

Three traveling schools, designed to bring product information and service to dealers and users, are touring the country under the sponsorship of the Harnischfeger Corp., Milwaukee, Wis., and are stopping for two-day visits at all P&H excavator dealers' stores. Each school is equipped with slide films, motion pictures, and display panels, as well as several actual assemblies of P&H equipment.

A P&H traveling school, one of three visiting P&H dealers throughout the country.

A P&H representative and an experienced serviceman accompany each school, which local dealers and managers attend for the first day's meeting. The second day is devoted to equipment displays for all heavy-equipment users.

Simplex Expands Sales And Distribution Network

Two new sales engineers and four distributors have been appointed by Simplex Forms System, Inc., Rockford, Ill.

The New York metropolitan area will be handled by sales engineer Joe Perrin, and Jack Carter will work in sales districts in Iowa and western Illinois.

New Way Concrete Forms, St. Louis, Mo., will act as distributor of Simplex Forms in Missouri, and John A. Uggla of Minneapolis, Minn., will represent the company in Minnesota, North and South Dakota, eastern Montana, and northern Wisconsin.

Other Simplex dealers named were Jack Crouch of Boichot Concrete Products Corp., Lansing, Mich., and Jack Hitzel of Clawson, to cover the Detroit area.

F & P Simplex Sales Co., 1240 Boeger Ave., Westchester, Ill., has been appointed Simplex distributor in the Chicago area.

Marysville Moves To Larger Area

The Marysville Tractor & Equipment Co., Marysville, Calif., has moved from its Fifth Street location to larger quarters at 712 Third St.

The new location provides an area of 3½ acres, of which 1½ acres are devoted to parts, service, display, warehouse, and office facilities. More than 300 pieces of new equipment from Caterpillar, John Deere, and other Marysville accounts are in inventory in the new store.

A Western Pacific Railroad spur track is adjacent to the receiving department, and four major freight-truck lines serve the plant.

Ken Beatie is manager, and Aaron But office manager of the Marysville firm.

I-H Appoints Dealer For Illinois, Indiana

Howell Tractor & Equipment Co., 7443 S. Racine Ave., Chicago, Ill., has been designated by the International Harvester Co., also of Chicago, as distributor of International power products in northern Illinois

Permit No. 280
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

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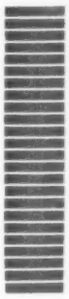
Contractors and Engineers
470 FOURTH AVENUE
NEW YORK 16, NEW YORK

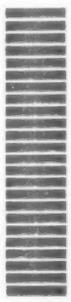


FIRST CLASS
Permit No. 280
(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

3c - POSTAGE WILL BE PAID BY

Contractors and Engineers
470 FOURTH AVENUE
NEW YORK 16, NEW YORK



Please send me information on new products and/or catalogs desc
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Listing of your Business Connection is essential for handling literature req

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Contractors and Engineers - Request Card - Feb. '55

Please send me further information on products shown in the Ad o

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Listing of your Business Connection is essential for handling literature req

Officers of the newly appointed International distributorship are seated, left to right, Tom LaVorene, president; and Dave Howell, vice president. Parts manager Carmen Napoli, left, and service manager Don Boyle stand behind them.

and northwestern Indiana. Seventeen counties in northern Illinois and Lake, Porter, and LaPorte counties in Indiana will be served by the company.

The new dealer is also sales and service headquarters for I-H hydraulic and cable-controlled blades, four-wheel scrapers, two-wheel high-speed rubber-tire earthmovers, and the complete line of International Drott Skid-Shovels, bullclam shovels, grubber blades, and the new Four-in-One Skid-Shovel.

Officers of the new distributorship are Tom LaVorene, president; Dave Howell, vice president; Don Boyle, service manager; and Carmen Napoli, parts manager.

Clark Appoints Dealers For Michigan Line

Nine new dealers have been appointed by the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich., to handle the Michigan line of excavator cranes and tractor shovels.

The companies named and the territories they cover are: Pressed Steel Car Co., New York, N. Y., for the territory of Hawaii; Jackson Machinery Co., Inc., New Orleans, the entire state of Louisiana; Contractors Service, Inc., Charlotte, the entire state of North Carolina; Spreitzer, Inc., Cedar Rapids, for eastern Iowa; J. J. Turner, Inc., Cleveland, eastern Ohio; J. C. and George Construction Equipment, Inc., Syracuse, for upper central New York.

Cunningham-Ortmayer Co., Milwaukee, Wis., has had its territory enlarged to include the upper Michigan peninsula.

Only Michigan tractor shovels will be handled by Midwest Equipment Co. The Fargo, N. Dak., branch will cover eastern North Dakota and northwestern Minnesota, and the Bismarck, N. Dak., branch will serve western North Dakota and northeastern Montana.

Field Machinery Co., Cambridge, will handle excavator cranes in eastern Massachusetts.

Southern Dealer Opens Eighth Branch Plant

The Rish Equipment Co., Bluefield, W. Va., has opened its eighth plant, this one in Dayton, Ohio. Located at 2420 Springboro Pike, the new plant is managed by Alan A. Anderson.

Other Rish offices are located in Bluefield, Charleston, and Clarksburg, W. Va.; Richmond and Roanoke, Va.; and Cincinnati and Portsmouth, Ohio. H. D. Anderson is vice president and general manager of the firm.

Cleaver-Brooks Names Southwest Distributor

Rex Bircket & Co., Tulsa, Okla., has been appointed by the Cleaver-Brooks Co., Milwaukee, Wis., to distribute its line of boiler equipment.

From offices at 424 S. Cheyenne Ave., the company will serve the entire state of Oklahoma and eleven counties in northwestern Arkansas.

Distributors—this is your department, so send in your news about new appointments, new plants, and new personnel, with photographs if available.

Perlite Management Team

Full responsibility for the management of the Perlite Institute, an international association of perlite producers, has been assigned equally to Richard S. Funk and Richard J. O'Heir. Formerly promotion director and technical director, respectively, Mr. Funk and Mr. O'Heir replace Richard L. Davis, who has resigned.

In his new position as administrative secretary, Mr. Funk will handle all promotion, public relations, and office functions of the secretary-treasurer that are not of a technical nature. Mr. O'Heir, as technical secretary, will administer all technical and research activities of the institute and will supervise the certification program for the conformance of many perlite aggregates to standards of the American Society for Testing Materials.

Accounting set-up keeps cost data up-to-date

By L. E. SWARTZ, Office Manager,
Ritter Bros., General Contractors, Harrisburg, Pa.

MANY factors combine to determine whether a general contractor will realize a profit on a particular contract. In view of this, there is a vital need to know from day to day how operating costs are running on a job. A detailed breakdown of material, equipment, and labor costs charged against each contract, when compared to submitted bid figures, tells the contractor how he is progressing dollar-wise.

Ritter Bros., a general contracting firm in business for over 29 years, is operated by four brothers: Russell E., Elmer L., Dale M., and Ralph M. Some of our outstanding construction jobs include the Harrisburg Hospital, the Sunbury, Pa., Community Hospital, the Joint Junior-Senior High School at Dillsburg, Pa., the John A. F. Hall Manor housing project at Harrisburg, the diesel locomotive facilities for the Pennsylvania Railroad at Enola, Pa., and the plant for the United States Steel Homes, Inc., division of United States Steel Corp. at Harrisburg.

To keep satisfactory cost control of our operations, we were faced with the problem of how to get detailed cost breakdowns for each contract quickly and accurately—especially when the firm was working on more than one contract at the same time. The manual methods of distributing material, equipment, and labor costs over individual contracts was a slow tedious job. If we were to have accurate itemized figures at the end of each day's operations, a streamlined method of handling the distribution of operating costs had to be found.

Mechanized accounting offered many distinct advantages, but we hesitated to spend a sizable sum of money for a machine which might be in use only part of the day. Our accounts receivable depend, of course, on the number of jobs under contract at any one time. But we continually have accounts payable, and we have payrolls covering crews which vary from 135 to 700 men.

A thorough study of mechanized accounting convinced us that we could use an accounting machine profitably. We felt that an initial investment in such a machine would be more than compensated for by easier handling of payrolls and accounts payable. Of greater importance was the fact that the distribution of all major operating costs to contracts could be performed daily and in time to permit these figures to be checked against our original contract.

Study of Firm's Problems

When the decision was made to install mechanized accounting in our offices, our peculiar problems were presented to Remington Rand. This manufacturer's study of our requirements resulted in the installation of accounting procedures and an accounting machine which, from its first day, has provided our company with the essential financial data it

Detailed breakdown of equipment, material, and labor costs informs contractor of daily progress of all his projects

must have to assure profits on every construction job handled.

The handling of payrolls presented some unusual problems. Our employees, whose number varies with the number and size of jobs, may be assigned to more than one job during a given pay period. Their time is reported on time sheets for each job or contract. It is possible for an employee to have his time reported on three or four time sheets during a pay period.

It was necessary to accumulate the total hours worked and gross pay for such employees, so that a single pay check could be issued with only one line of posting for an employee's earnings and deductions record. At the same time, we wanted to list the employee's time and earnings under the contract or job.

Another problem was to reimburse superintendents who found it necessary to pay employees discharged from the job out of an operating fund. These out-of-office payments had to be posted to the payroll account and also to the discharged employee's earnings and deductions records.

Basically, then, three types of payroll entries had to be handled: those for employees working an entire pay period at one job; those for employees working at more than one job during a pay period; and those for employees discharged during a pay period and paid immediately from the job operating fund.

Under the procedures set up for the Remington Rand accounting machine, a form called the Partial Earnings slip was printed. This form is similar to our pay check with stub, but does not have the carbon strip. Timekeepers were instructed to indicate on time sheets the contract under which an employee worked, when the employee started to work, and if the employee had been transferred from another job.

When time sheets indicate that an employee worked on more than one job during a pay period, the Partial Earnings slip is inserted in the accounting machine in place of the usual pay check. The amount of the employee's earnings for that job is entered. No deductions are made at this time.

When the employee's name appears on another time sheet, the Partial Earnings slip is again inserted in the accounting machine and the new entry made immediately below the previous entry. This procedure is followed until all time sheets for a pay period have been recorded.

Preparation of Check

On completion of the payroll, entries on the Partial Earnings slips are manually added and the amount of withholding tax, together with other deductions, is noted. From these Partial Earnings slips the pay check is prepared in the usual way, with the employee's earnings and deductions record card inserted in the

(Concluded on next page)

Posting accounts-payable items to the purchase journal, general ledger, and/or sundry ledger becomes a simple task with the Remington Rand accounting machine operated above by an employee of Ritter Bros., Harrisburg, Pa., general contractor.

(*Continued from preceding page*)

machine. This group is captioned Supplementals.

The Partial Earnings slip is also used when an employee has been paid by a superintendent during any pay period. When this occurs, the employee's earnings record card, however, is inserted in the accounting machine. Since there is no carbon strip, only the amount advanced by the superintendent and the name of the employee are recorded here. A manual total shows the amount due the superintendent, and a check is prepared to reimburse the superintendent's job operating fund.

Check numbers are not shown in the journal where a Partial Earnings slip is used, nor is a check number shown for wages advanced by a superintendent. Where wages are advanced, the letters WA are typed in place of the check number; where the entry represents a partial earning, the letters PS are used.

An adding machine total is figured for all items indicated PS, and another total figured for those items marked WA. The total of all WA entries must equal the total of the checks issued to the superintendent; the PS total must agree with the total of the partial earnings summary. This provides an audit.

The summary of payrolls by contract is then prepared in the usual manner, with the exception that the totals of the supplementals begin with the quarterly total of earnings, gross earnings for the period being entered when the original entry is made. This results in a credit figure in the amount of the checks written.

The total of the summary covering checks reimbursing the superintendents for wages advanced is not included in this summary, since these amounts have already been included in the contract totals.

Accounts Payable

As for accounts payable, it is necessary to charge all direct purchases against specific contracts without delay, and without consideration as to the type of purchase, i.e., whether for material, equipment, or labor. While these charges are made to the sundry job ledger without regard to type, the entries to the general ledger must be made on the basis of type of purchase. In addition, provision has to be made for charging items which are not purchased for a specific job but are of a general nature, such as trucks, office equipment, etc.

In handling accounts payable, there are two types of invoices for entry in the general purchase journal: those covering materials and equipment purchased for a specific job, and those covering items purchased for other than a specific job.

The first group is charged directly to the contract through a sundry job ledger, while the second group is charged to the proper general ledger account, either as an asset or expense-account item.

To secure the necessary records, three ledger cards are used. These include ledger, accounts-payable ledger, and sundry-job ledger.

All three record cards are of identical size, with columns which register. They differ only as to headings and color. Two debit columns are used—one for the general ledger debits, and the other for sundry ledger debits. This arrangement permits posting to the general ledger or sundry ledger as required, while maintaining vertical column control.

The procedure is to insert the accounts payable ledger card on the left side of the acounting machine, and either the general ledger card or sundry ledger card on the right side. Posting is done in the left debit column, and when posting is done on the sundry ledger card, the figures appear in the right debit column. If distribution is to be made to more than one account, the proper card is inserted and the amount posted.

Payments

When payments are to be made, the same two types of items are handled as under purchases: those where the invoices have been entered through the purchase journal, and those not so entered.

The first group is handled in the usual manner—by posting to accounts payable and entering cash and discount. The second group is handled similarly to the second group discussed under purchase, except that the proper ledger card—either general ledger or sundry ledger—is inserted on the left side of the machine, thereby charging these accounts. The cash and discount are also entered.

At the end of each month, the sundry ledger column is analyzed by code and summarized at the bottom of the last page on both the purchase journal and disbursements journal. These entries can be made in the general ledger to the proper accounts.

With the Remington Rand accounting machine, which is housed in a Safe-File to protect our accounting records from fire, payrolls take no more than a day to prepare. Even with as many as 700 employees, payroll records can be completed and checks issued in a day and a half.

Accounts payable, even at peak construction periods, total about 175 different vendors. Handling, this number of accounts payable takes a minimum of time in posting and distribution of charges.

Our investment in the Remington Rand accounting machine is returning dividends. Payrolls and accounts payable are accurately handled, with proper cost distribution made to all contracts quickly. The daily summaries of operating costs charged to each job furnish us with the data we need for complete control to assure our realization of profits on each contract. THE END

New snowplows for all models of Michigan tractor shovels feature hydraulic lift.

Snowplow Attachment For Tractor Shovels

■ New hydraulic snowplow attachments for all models of Michigan tractor shovels have been announced. The cutting width of these attachments ranges from 8 feet for the Model 75 to 9 feet for the Model 175. The wing-type units, approximately 4 feet high, have deflectors available as optional equipment.

The plows can be attached quickly at four points. They can be raised clear of drifts, making it simpler for the tractor to back out along a lane it has cleared. They can also be agitated to cut more quickly through heavily-packed snow drifts.

Plows range in weight from 1,850 to 3,400 pounds, and have adjustable ground shoes and replaceable cutting edges.

For further information write to Clark Equipment Co., Construction Machinery Division, Benton Harbor, Mich., or use the Request Card at page 18. Circle No. 268.

Catalog on Concrete Forms And Various Accessories

■ Concrete forms, form ties, and accessories are illustrated in the new Universal Form Clamp catalog. The literature has a quick-reference guide to help contractors select the proper form tie to meet working load specifications.

Another feature of the catalog is a form design chart and formula for developing stud, wale, and tie spacings. Information on reinforcing-bar supports and road dowel-bar supports is also included.

To obtain Catalog No. 160 write to Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago, Ill., or use the Request Card at page 18. Circle No. 391.

Data on Structural Bolts

■ The newest addition to the products offered by the bolt and nut division of the Republic Steel Corp. is a line of high-strength structural steel bolts. A booklet just released explains the advantages of using these bolts for structural fastening. The literature includes the complete ASTM Specification A-325 for assembling structural joints with the bolts, as well as the necessary information needed to order the bolts.

To obtain this literature write to Republic Steel Corp., 3100 E. 45th St., Cleveland 27, Ohio, or use the Request Card at page 18. Circle No. 373.

Hyster Film Released

A 16-mm sound-color film showing excavation and crane work with the Hyster Hystaway mounted on Caterpillar-built tractors has been released.

"Design for Excavating", which runs for 12 minutes, was filmed at actual job sites and shows the convertibility of the machine to a shovel, backhoe, dragline, clamshell, etc.

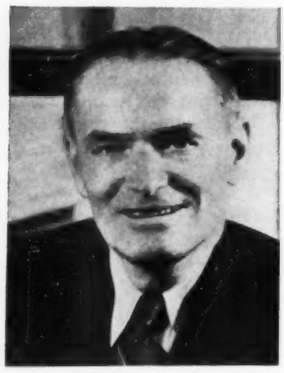
Arrangements for viewing the film may be made through Caterpillar-Hyster dealers or through the Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg.

Marietta Concrete Acquires Conroe Co.

The Marietta Concrete Corp., Marietta, Ohio, has assumed ownership and management of Conroe Concretes Co., Jamestown, N. Y., and has named Robert Christy to head the Jamestown plant. The company's existing product line of concrete building block and other precast-concrete products will be expanded, under the new arrangement.

New items to be manufactured will include precast-concrete building wall panels and beams.

NAMES IN THE NEWS



The president of H. K. Ferguson Co., Wells N. Thompson.

Thompson Is Elected President of Ferguson

Wells N. Thompson, former vice president and manager of the company's New York office, has been named to succeed Otto F. Sieder as president of the H. K. Ferguson Co., engineering and building firm of Cleveland, Ohio. Mr. Sieder has accepted the newly created post of vice chairman of the board, and will continue to serve actively with the company.

Mr. Thompson, a veteran of 25 years' service with the company, has supervised design and construction in all kinds of industrial facilities in this country and abroad. At the present time he is supervising the design and construction of the $20 million chemical plant for Canadian Industries Ltd., near Kingston, Ontario, Canada.

NSPE Nominates Officers

Allison C. Neff, vice president of Armco Drainage & Metal Products, Inc., Middletown, Ohio, has been nominated as a candidate for president of the National Society of Professional Engineers. He will succeed Clarence T. Shoch.

A former officer in Ohio engineering societies and vice president of the Ohio Highway and Turnpike Association, Mr. Neff has been associated with Armco since 1944. He holds a mechanical engineering degree from Case Institute of Technology.

Six regional vice presidents and a treasurer have also been nominated to represent the 33,000 members of the organization.

Maynell Heads Branch Office of Mahony-Troast

W. J. Maynell has been appointed manager of the Philadelphia, Pa., branch of Mahony-Troast Construction Co., Clifton, N. J. Mr. Maynell has been with the company since 1938 and has been active in all phases of the company's field operations along the eastern seaboard.

The former Philadelphia manager, Jeffrey A. Stone, will continue in an advisory capacity with the company even though he has retired from active service.

Grove Appointed to Rensselaer Council

Philip H. Grove of Pelham, N. Y., has been appointed vice chairman of the Associate Development Council for Architecture by Rensselaer Polytechnic Institute, Troy, N. Y. Mr. Grove is vice president of Grove, Shepherd, Wilson & Kruge, Inc., of New York City.

The council will assist Rensselaer in developing an architectural program to meet modern needs.

The newly elected president of United Engineers & Constructors, Inc., Henry M. Chance.

H. M. Chance Heads United Engineers

The board of directors of United Engineers & Constructors, Inc., Philadelphia, Pa., engineering and construction firm in the utility, industrial, and chemical fields, has elected Henry M. Chance, II, president of the organization.

Mr. Chance has been associated with the company for the past 18 years, having started as a design engineer shortly after his graduation from the Towne Scientific School of the University of Pennsylvania. In 1946, he was named assistant to the president and in 1949 was elected vice president and a director.

He is a member of the American Society of Civil Engineers, Association of Iron and Steel Engineers, and Franklin Institute.

Bollen New HRB Engineer

A former testing engineer for the Nebraska Department of Roads and Irrigation, Ray E. Bollen, has been appointed to a position as staff engineer with the Highway Research Board, Washington, D. C. He has taken up duties as engineer of materials, construction, and maintenance, succeeding Elmer M. Ward, new assistant director of the HRB.

In his new post, Mr. Bollen will visit with members of state highway departments, colleges and universities, and other research agencies to discuss the status of highway research and new developments in this field. He will also cooperate with various committees in solving highway problems.

A civil engineering graduate of the University of Nebraska in 1930, Mr. Bollen also holds a master's degree in engineering mechanics from Nebraska U. He was associated with the Nebraska Department of Roads and Irrigation for twenty-four years.

Walter W. Walb Heads Power Crane Association

Members of the Power Crane and Shovel Association elected Walter W. Walb, president and general manager of the American Steel Dredge Co., Inc., to the presidency of the association at the annual meeting in Chicago. He succeeds Julian Steelman. D. W. Lehti was named vice president.

Fifteen manufacturers of power cranes, shovels, trench hoes, and other earthmoving and material-handling equipment comprise the association.

New directors of the Concrete Industry Board of New York City confer with Roger H. Corbetta (center), chairman of the CIB board of directors. Wallace K. Harrison (left) is a new member of the board, while Vice Adm. John J. Manning (Ret.) is the first full-time managing director.

Former Navy Construction Chief Named to CIB Post

The former chief of the Navy Bureau of Yards and Docks, Vice Adm. John J. Manning (Ret.), has taken office as managing director of the Concrete Industry Board of New York City. He is the first full-time managing director of the organization, founded four years ago to improve the quality and techniques of concrete construction.

Adm. Manning, who retired from the navy in 1949 after 32 years of service, holds an engineering degree from Rensselaer Polytechnic Institute. His career in the Navy's Civil Engineers Corps was climaxed in 1945, when he was named chief of the Bureau of Yards and Docks. He served in that capacity until his retirement. Most recently, he has served as technical director for Kelly & Gruzen, New York architects and engineers.

The Concrete Industry Board also announced the election of Wallace K. Harrison as American Institute of Architects representative on the CIB board of directors.

Clark Heads New Branch Of U. S. Testing Co.

The newly formed Claymont, Del., branch of the United States Testing Co., Inc., Hoboken, N. J., will be managed by George A. Clark. A civil engineer, Mr. Clark has served as resident engineer on the construction of the television antenna on top of the Empire State Building and, in 1952, was in charge of paving operations at the Air Force base in Thule, Greenland.

Two Promotions Made By Fisher Contracting

Effective last month, Warren Hunter became construction division manager of Fisher Contracting Co., Phoenix, Ariz., one of the largest firms in the southwest. His position as chief engineer of the firm has been taken by Carleton Robb. Del Fisher, former construction division manager, will continue as president and general manager of the firm.

Mr. Hunter, who has been chief engineer for Fisher for the past five years, will be in charge of all construction operations for the company. Mr. Robb, assistant chief engineer since last year, will be responsible for Fisher's estimating operations.

A section of 90-inch-diameter drain pipe on a road job is securely fastened by the Ingersoll-Rand Impactool. The unit was used both inside and outside the 694-foot length of pipe required.

Nuts on the dual wheels of a large Euclid ump truck are removed quickly by a workman with a size 534 air Impactool. Fast repair work kept equipment operating on the project.

Air tools help save days on drain-pipe installation

An estimated saving of 9 days on the installation of steel drain pipe along a 4-mile section of State Route 126 in Pennsylvania was achieved by the Central Pennsylvania Quarry, Stripping & Construction Co., Hazleton, through the use of air and electric Impactools. This job, between Crystal Springs and Breezewood, involved setting 694 feet of sectional-plate drain pipe ranging from 78 to 90 inches in diameter.

Substituting the air tools for hand wrenches, a crew of 7 men lopped 504 hours off the time required to assemble the pipe with more than 12,000 closely spaced ¾-inch bolts. The galvanized steel pipe, laid across the road at three points, consisted of 324 feet of 78-inch pipe, 194 feet of 84-inch pipe, and 176 feet of 90-inch pipe. Men worked both inside and outside the pipe, lining up holes in the overlapping sections and inserting the bolts alternately from inside and outside.

The nuts were started by hand and tightened with the size 534 air tool. Air was supplied to Impactools working both inside and outside the pipe by a portable air compressor. Altogether, an estimated 3 days was saved in connecting each of the varying size lengths of pipe.

Maintenance Use

Aside from work on the drain pipe, the contractor used the power tool in time-saving maintenance operations. Tires on 22-ton Euclid dump trucks were changed, track pads on bulldozers were tightened, and 10-foot

cutting edges on buckets were replaced with the tool, saving between 50 and 66 per cent in labor and time.

The time required to change a tire on a Euclid, the company found, was cut approximately in half when the tool was used to run 11 nuts on each dual wheel. A similar saving was chalked up in maintenance work on bulldozers. The four bolts which secure each bulldozer track pad continually work loose and have to be tightened to prevent damage to the pads. The 50 pads on each pair of tracks mean that a total of 200 bolts have to be tightened on each unit—a laborious job for a man with a hand wrench. The Impactool, with 1,270 rotary impacts per minute, finished the tightening job quickly and reduced downtime for each unit considerably.

By substituting the tool for a hand wrench, workmen were also able to remove the 38 ¾-inch bolts on the buckets in one hour, an operation which two men normally do in three hours.

Shop Work

Aside from finding the Impactool efficient and economical on its jobs, Central Penn uses the unit to cut working time in its Hazleton shop. There, the company maintains 35 bulldozers, 3 draglines with 200-foot booms and 8-cubic-yard buckets, 74 off-the-road trucks, and about 60 other trucks. Taking care of this equipment in the 300×60-foot shop are 35 mechanics.

Ingersoll-Rand air and electric Impactools available for shop work include two size 4U units for use on engine and transmission components, three 34U electric Impactools for larger jobs on which nut and bolt sizes run up to 1¼-inch thread diameter, and a size 534 unit for jobs where bolt sizes run up to 1½ inches. These tools in the shop are powered by generators on the draglines.

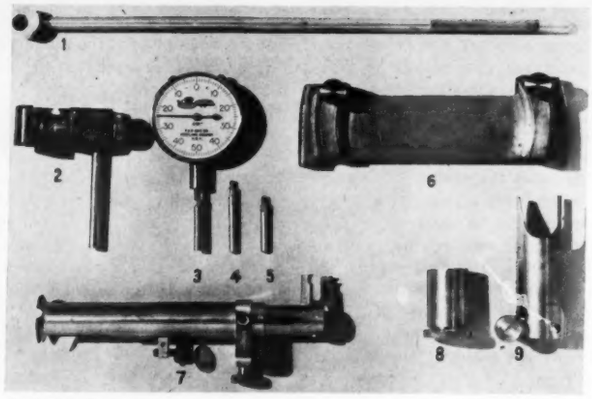
As on its drain-pipe job, the company uses the tools to effect a saving in time required to do repair work in the shop. Replacing the lip of a dragline's 8-cubic-yard bucket, a 3-day job for two men, is done in about 3½ hours with a 34U electric Impactool or one of the big air tools.

In an unusual application, Central Penn uses the impact tool to bend 1-inch steel plate to conform with the lip curvature of a dragline bucket. The forward section of the bucket, a manganese steel casting, has steel plates welded to it to form the sides, top, and bottom. Replacing the top and sides is relatively simple, but a bottom plate, 1-inch thick, must be bent to conform to the slightly curved shape of the lip. In rebuilding a bucket, it is necessary to flame-cut the new bottom plate to size and grind the edges. Rivet holes are then drilled into the plate, which is placed in position against the lip. Then the plate is secured with ¾-inch bolts at the center where there will be no bending, and the nuts are drawn up tight by the Impactool. As the remaining bolts are put in on alternate sides, the tool bends the heavy steel plate into position against the lip. After the plate has been welded and the weld heat treated, the bolts are removed and replaced with rivets.

Strictly a shop-use for the tool is in the replacement of a pulley bearing at the end of one of the crane booms. This bushing is a press fit in the two arms that support the pulley. It is not feasible to take the long boom to a power press, so mechanics turn down the press-fit diameter of the bushing to a slip-fit diameter for a short distance, and the bushing is started by hand. A threaded bar is put through the inner diameter, large washers are placed at each end, and a nut is started by hand. The power of the Impactool is great enough to pull the bushing into position by tightening the nut.

THE END

▲ Replacing the manganese-steel lip on this 8-cubic-yard bucket, a job normally requiring 3 to 4 days, is done in as many hours with the aid of the Impactool. Here a 1¼-inch securing bolt in the hitch casting is being removed.



The P&G valve-gapper overhaul kit for Series GM-71 diesel engines includes (1) dial indicator handle; (2) diesel engine control tube adaptor; (3) dial indicator; (4) standard-cylinder bore; (5) standard-cylinder liner; (6) combination master gage and holder; (7) valve-gapper; (8) micrometer plug gate; (9) timing attachment. ►

New Kit Brings More Precision to Diesel Servicing And Adds New Uses for Valve-Gapper in Overhaul Work

■ A new overhaul kit for Series GM-71 diesel engines greatly extends the usefulness of the valve-gapper in diesel service work. The new P&G valve-gapper overhaul kit includes instruments not only for setting valve clearance, timing fuel injectors, and balancing fuel-injector racks, but also provides adaptors for micrometer-accurate measurement of the height of the cylinder liners, uniformity of counterbore, uniformity of cylinder bore, and cylinder liner wear.

The principal instruments in the overhaul kit are the Model 201 valve-gapper—which is already being used extensively in shops servicing and rebuilding Series GM-71 diesel engines—and a dial indicator. The indicator, calibrated to .001 inch, makes precision measurements.

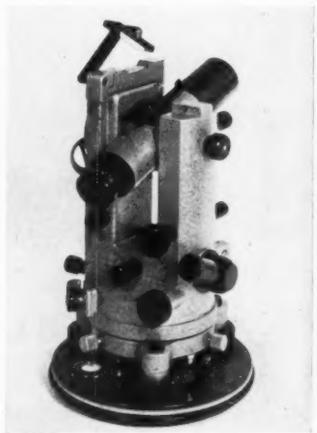
Most operations with the valve-gapper and its adaptors are accomplished in three simple steps. To adjust the valve gap, for example, the instrument is placed on the valve spring retainer and held firmly between the bit and the rocker arm by spring pressure in the valve-gapper. The valve gap is then closed by hand pressure and the dial indicator needle adjusted to zero. Pressure is then released, and the clearance is registered on the dial. The mechanic then adjusts the gap to the engine maker's recommended clearance.

The complete overhaul kit consists of a Model 201 valve-gapper, micrometer plug gage, timing attachment, diesel engine control-tube adaptor, dial-indicator handle, dial indicator, standard-cylinder bore, standard cylinder liner, and combination master gage and holder.

For further information write to P&G Mfg. Co., 2262 N. Albina Ave., Portland 12, Oreg., or use the Request Card at page 18. Circle No. 346.

Newly Imported Transit With Erecting Eyepiece

■ A newly imported instrument, the Askania Tk transit with erecting eyepiece, is announced by Geo-Optic Co., Inc., 170 Broadway, New York 38, N. Y. Among special features of the instrument are a battery lamp that illuminates the reading circle during night work, and a metal hood



that protects the transit during transport or in the rain. The hood is held to the base plate by folding hooks. No other case is needed.

The Askania Tk transit is used for actual survey observations like tachymetry, traversing, and triangulations, as well as for cadastral and city surveys. It is also recommended for use in highway, railroad, bridge, and other heavy construction.

Both graduated circles and the micrometer scale can be read easily in the joint reading microscope, regardless of the position of the telescope. Direct readings are taken to 20 seconds, and accurate estimates to 5 seconds are possible on the Askania Tk transit. A repeating lever enables fine orienting of the horizontal circle and direction transfer, as well as repeating of angles.

For further information write to the company, or use the Request Card at page 18. Circle No. 267.

CONVENTION CALENDAR

February 14-16 Quality Concrete Short Course

Fourth Annual Short Course, Georgia Institute of Technology, Atlanta, Ga. R. E. Eskew, coordinator of short courses and conferences, Georgia Institute of Technology.

February 14-16 High-Speed Computer Conference

Conference, Pleasant Hall, Louisiana State University campus, Baton Rouge, La. Dr. J. W. Brouillette, director, General Extension Division, Louisiana State University.

February 18 Symposium on Geology as Applied to Highway Engineering

Sixth Annual Symposium, Remsen Hall, Johns Hopkins University campus, Baltimore, Md. Allan Lee, research engineer, State Roads Commission, 108 E. Lexington St., Baltimore 3, Md.

February 18-19 National Society of Professional Engineers

Annual Spring Meeting, Hotel Charlotte, Charlotte, N. C. Kenneth E. Trombley, NSPE, 1121 15th St. N. W., Washington 5, D. C.

February 21-24 American Concrete Institute

Fifty-first Annual Convention, Hotel Schroeder, Milwaukee, Wis. R. E. Wilde, ACI, 18263 W. McNichols Road, Detroit 19, Mich.

February 21-24 Cornell Turf Conference

Conference, Statler Hall, Cornell University, Ithaca, N. Y. Dr. J. F. Cornman, Department of Ornamental Horticulture, Cornell University, Ithaca, N Y.

February 24-25 Highway Engineering Conference of University of Colorado

Twenty-eighth Annual Conference, University of Colorado, Boulder, Colo. Roderick L. Downing, conference chairman, Department of Civil Engineering, University of Colorado.

March 1-3 Illinois Highway Engineering Conference

Conference, Illini Union, Urbana, Ill. Professor William S. Pollard, assistant conference director, 303 Civil Engineering Hall, University of Illinois, Urbana, Ill.

March 2-4 Association of Highway Officials of North Atlantic States

Meeting, Hotel Traymore, Atlantic City, N. J. A. Lee Grover, secretary-treasurer, AHONAS, 1035 Parkway Ave., Trenton, N. J.

March 7-9 Utah Highway Engineering Conference

Sixteenth Annual Conference, University of Utah campus, Salt Lake City, Utah. A. Diefendorf, conference director, University of Utah.

March 7-11 American Congress on Surveying and Mapping and American Society of Photogrammetry

Consecutive meetings, Shoreham Hotel, Washington, D. C. Fowler Barker, deputy for public relations, ACSM and ASP, 17 Dupont Circle, Washington, D. C.

March 7-11 National Association of .. Corrosion Engineers

Annual Conference and Exhibition, Palmer House, Chicago, Ill. A. B. Campbell, executive secretary, NACE, 1061 M & M Bldg., Houston 2, Texas.

March 9-12 American Concrete Pipe Association

Forty-seventh Annual Meeting and Convention, Sheraton-Plaza Hotel, Boston, Mass. Howard F. Peckworth, managing director, ACPA, 228 N. La Salle St., Chicago 1, Ill.

March 14-17 Associated General Contractors of America

Meeting, Roosevelt Hotel, New Orleans, La. C. I. Mehl, administrative assistant, AGC of America, 1227 Munsey Bldg, Washington 4, D. C.

March 15-17 Michigan Highway Conference

Meeting Pantlind Hotel, Grand Rapids, Mich.

March 22-25 New York State Association of Highway Engineers

Sixteenth Annual State Convention, Hotel New Yorker, New York, N. Y. Fred F. Ligouri, convention chairman, P. O. Box 551, Poughkeepsie, N. Y.

April 5-7 Ohio Highway Engineering Conference

Meeting, Museum Auditorium, Ohio State University, Columbus, Ohio. Emmett H. Karrer, professor of civil engineering, Brown Hall, Ohio State University.

April 11-14 Purdue Road School

Forty-first School, Memorial Union Bldg., Purdue University, Lafayette, Ind. Ben H. Petty, professor of highway engineering, Civil Engineering Bldg., Purdue University.

April 11-15 Greater New York Safety Council

Meeting, Hotel Statler, New York, N. Y. Paul F. Stricker, executive vice president, GNYSC, 60 E. 42nd St., New York 17, N. Y.

April 11-16 Concrete Reinforcing Steel Institute

Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. H. C. Delzell, managing director, CRSI, 38 S. Dearborn St., Chicago 3, Ill.

April 13-14 Earth-Moving Industry Conference

Meeting, Pere Marquette Hotel, Peoria, Ill. Harlow Piper, designer, Engineering Department, Caterpillar Tractor Co., Peoria.

April 13-15 American Society of Lubrication Engineers

Annual Meeting and Lubrication Exhibit, Sherman Hotel, Chicago, Ill. W. P. Youngclaus, Jr., administrative secretary, ASLE, 84 E. Randolph St., Chicago 1, Ill.

April 13-15 American Wood Preservers Association

Meeting, Jefferson Hotel, St. Louis, Mo. D. A. Mitchell, chairman arrangements committee, AWPA, 7246 Burrwood Drive, St. Louis 21, Mo.

June 7-10 American Welding Society

Third Annual Welding Show concurrent with Annual Spring Technical Meeting, Municipal Auditorium, Kansas City, Mo. Joseph G. Magrath, national secretary, AWS, 29 W. 39th St., New York, N. Y.

Erection work speeded on 22-story skyscraper

The rapidly changing skyline of Jacksonville, Fla., is one of the most significant signs that the Sunshine State has now reached economic maturity. While the tourist trade still accounts for nearly a third of the state's business, industries are springing up from one end of the peninsula to the other, attracting throngs of new residents each year. In fact, population has increased by more than 30 per cent in the last three years—the highest gain of any state in the east.

Riding the crest of the boom is the city of Jacksonville, the gateway to Florida. In the last few years extensive improvements in harbor, bridge, and highway facilities have expanded the scope of the city's economy and sparked new interest in commercial building.

The most outstanding structure now under way located near the downtown area is the 22-story South-Central Home Office of the Prudential Insurance Co. The $12 million skyscraper, the tallest in Florida, will have over 400,000 square feet of floor space and will be completely air-conditioned. Work was started by Daniel Construction Co., Inc., Birmingham, Ala., during the summer of 1953 and was completed late last year.

The main structure measures roughly 530 × 215 feet and is 8 stories high. The tower section is 195 feet long and 87 feet wide.

A Fairfield material conveyor raises brick to the second floor as concrete work and facing follow closely the steel erection. The Patent swinging scaffold is used to set small pieces of facing stone.

American guy derricks with 110-foot masts and 100-foot booms erect the top floors of the Prudential Insurance Co.'s new South-Central Home Office at Jacksonville, Fla. Exterior beams and columns on the lower floors have already been concreted. *C&E Staff Photos*

Foundation

Foundations for the new skyscraper consist of 2,260 Raymond step-taper piles driven 30 feet to rock. The number of piles per cluster varies from 4 to 98.

Excavation for pile caps and footings was done in the dry after a 1,400-foot ring of Griffin wellpoints was installed around the foundation area—only 200 feet from the river. Points were set 8 feet apart and connected by an 8-inch header. The system was operated for 5 months, keeping dry an area that was 22 feet below normal river elevation.

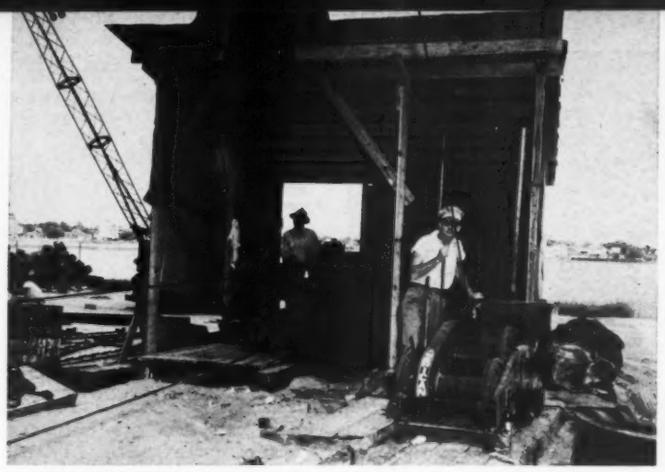
Concrete caps from 3 to 6 feet thick

were poured over the piles in metal forms. Caps were connected by grade beams on a mat of sand. Column-supporting piers were then built up to form 30 × 24-foot bays. Concrete exterior walls were constructed at the same time and waterproofed with Ironite.

Steel Erection

Nearly 6,000 tons of structural steel framework was erected in 4 months by Ingalls Steel Construction Co., Birmingham, Ala. The contractor used high-tensile bolts in this operation, doubtlessly saving months of erection time. The use of these bolts was of particular advantage because of the shortage of trained riveters.

Workmen tightened the bolts with impact wrenches that were tested twice a day for proper calibration. Air for the wrenches was supplied by a Gardner-Denver 215-cfm compressor.



A large American two-drum hoist (left) powered by a General Motors diesel engine is used to operate an Archer material elevator, while the smaller American, also a two-drum model and powered by a Wisconsin engine, raises bundles of flooring.

The lower floors were erected with Manitowoc crawler cranes, and the upper floors with two American guy derricks having 110-foot masts and 100-foot booms. Both derricks were operated by two-drum hoists set up on the second floor. One hoist was an American powered by a Minneapolis-Moline gasoline engine and the other was powered by a Buda diesel. Hoist operators received signals from the erection foreman by telephone headsets.

Placing the concrete floors followed rapidly behind the steel erection. Exterior beams and columns, plus those members supporting masonry walls, were fireproofed with concrete. All others were covered with perlite plaster.

Floors consisted of Robertson Q-flooring covered with 2 inches of lightweight concrete. The concrete weighs 100 pounds per cubic foot, has a strength of 1,250 psi, a slump of 3 inches, and is air-entrained with Darex agent.

The 8-foot span Q-floor panels, handled in 24-foot lengths, were easily hoisted in bundles by a small American two-drum hoist powered by a Wisconsin gasoline engine. Workmen set the lightweight panels by hand and spot-welded them together.

Ready-mix concrete was dumped into a V-type bucket, hoisted in an Archer double elevator, and emptied into a portable two-chute hopper on the floor. The Archer elevator was operated by an American two-drum hoist powered by a General Motors diesel. Workmen charged hand buggies at the hopper and wheeled the concrete to the pour. The finished concrete was later topped with a ½-inch layer of cement and covered with rubber and asphalt tile.

The ceilings, hung from the Q-flooring, consist of wire lath covered with Zonolite fireproofing and faced with acoustic tile.

The exterior walls consist of cut Alabama limestone. Special areas are faced with Georgia marble and North Carolina pink granite. Workmen set stone from Patent swinging scaffolds. Large pieces of marble and granite are set in position with hand winches. Brick is raised from ground level to the lower floors in a Fairfield conveyor.

Personnel

C. G. Englund, vice president of Daniel Construction Co., is project manager, and H. H. Garland is superintendent for the contractor. S. Bower is superintendent for Ingalls Steel Construction Co. J. Wassmer is project coordinator for the Prudential Insurance Co.

Architects are Kemp, Bunch & Jackson, Jacksonville, Fla. THE END

Malleable Iron News

The Malleable Iron Fittings Co., Brandford, Conn., has appointed Albert B. Stevens sales manager of the pole hardware division of the company. He succeeds Ogden W. Sutro, who has become assistant to the president.

Sikacrete, new accelerating densifier, was used during winter concrete work on the new state hospital at Ancora, N. J. The project included fourteen buildings and interconnecting tunnels (foreground).

Accelerating Densifier Aids Winter Concreting

■ A new aid for cold-weather concreting is an additive called Sikacrete, which accelerates setting time to shorten the period during which poured concrete must be protected from freezing. The additive, manufactured by Sika Chemical Corp., is a solution of an approved accelerator and Sika's Plastiment densifying agent. This agent controls cement gel formation to reduce shrinkage and increase workability, density, uniformity, and strength of the concrete. It is also responsible for the increase in water resistance and surface hardness which Sikacrete gives concrete. The additive also permits form stripping and finishing work to begin sooner and inhibits surface checks or cracks in the concrete.

The water content of a mix with Sikacrete is reduced not only by the volume of the additive itself, but, in addition, by one quart of water per sack of cement, because of the increased workability that is provided for the mix. Sand, aggregate, and cement proportions do not have to be adjusted. The additive does not interfere with lime, fly ash, air-entraining agents, or other admixtures.

Though the amount of additive used will vary with the setting time and hardening rate desired, 1½ gallons of Sikacrete to a cubic yard of concrete is generally satisfactory at temperatures above the freezing point. Two gallons is sufficient at 28 degrees F, and 3 gallons at 25 degrees F.

The first large-scale use of Sikacrete was on the 21-million-dollar multi-structure state hospital at Ancora, N. J., where most of the individual buildings are connected with concrete tunnels below grade. By using the densifier in summer and Sikacrete in winter, the contractors, Turner Construction Co. and A. A. LaFountain, Inc., were able to provide uniform slump, water-cement ratios, and setting time throughout the job.

For further information write to Sika Chemical Corp., 35 Gregory Ave., Passaic, N. J., or use the Request Card at page 18. Circle No. 266.

Booklet Gives Details On Diesel Crawler Tractor

■ Features of the Allis-Chalmers HD-9 diesel-powered crawler tractor are shown in a new catalog available on request.

The catalog features a cutaway view of the HD-9 and illustrations which help tell the engineering, mechanical, and operating story of the unit. Allied equipment and special accessories matched to the HD-9 are also pictured.

To obtain this literature write to the Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 287.

New Welding Process

■ New literature describes a recent welding technique, the EB Weld Insert process. Developed by the Electric Boat Division of General Dynamics Corp., the process reportedly permits deposition of a root pass which produces a smooth and uniform weld surface even though the actual welding is done on one side only.

The process and insert used are said to be especially suitable for butt welding of stainless and alloy-steel pipe, both seamless and welded.

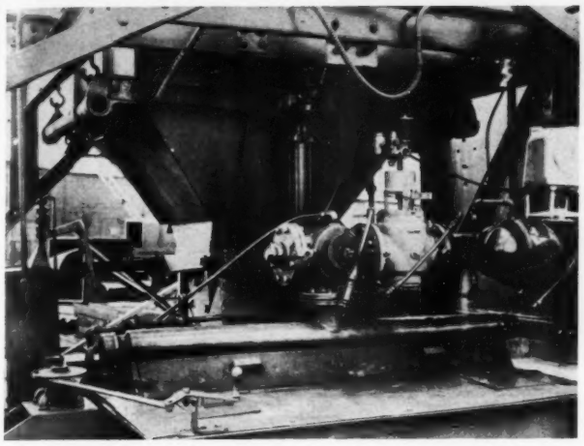
To obtain this literature write to Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa., or use the Request Card that is bound in at page 18. Circle No. 385.

Gar Wood Appoints

The completion of the new product development and re-engineering program covering truck equipment and construction machinery has brought about the appointment of C. W. Snider as assistant to the director of sales of Gar Wood Industries, Inc., Wayne, Mich.

In his new assignment, Snider will assist E. B. Hill, vice president and director of sales, in the administration of sales and marketing functions for all Gar Wood products.

Automatic Batch System for Handling Asphalt



The Fluidometer System installed in this asphalt plant controls the quantity of asphalt sprayed on aggregate for blacktop roads. Accuracy within ½ to 1 per cent is maintained.

■ A new control device known as the Fluidometer System batches quantities of light and heavy liquids automatically. The system, which is recommended for handling asphalt, consists of a Rockwell Rotocycle measuring element, a motor-operated control register, and a solenoid valve.

After a control dial is set for the desired amount of liquid, a start button is pushed to open the valve and allow the liquid to go through the meter. The meter shaft is directly coupled to the controls and turns the hands to the zero point. At zero, the controlling element automatically closes the valve and returns the hands to the previous setting. The starting push button can be eliminated by the substitution of a timing device.

The amount of liquid to be passed is controlled by a change in the setting.

For further information write to Hetherington & Berner, Inc., 701-45 Kentucky Ave., Indianapolis 7, Ind., or use the Request Card at page 18. Circle No. 349.

Bureau of Roads Issues Annual Report for 1954

The 1954 annual report of the U. S. Bureau of Public Roads, covering the fiscal year ended June 30 of last year, is now available from the Government Printing Office. The report discusses all phases of the federal-aid construction program, which reached new high levels during the early part of last year.

Included among topics discussed are improvements on the national system of interstate highways, on primary and urban highways, and on farm-to-market roads. Outstanding individual federal-aid projects, new highway legislation, work in the field of highway safety, and foreign activities are also treated.

Copies of the report are priced at 30 cents, and may be had by writing the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Good lubricants at regular intervals are good for your equipment.

Dump-Body Hoists For Tandem-Axle Trucks

■ A catalog covering new Galion Allsteel Duo-scopic hoists has been announced. Suitable for use on tandem-axle trucks, the Model 55381 and Model 66381 hoists have lifting capacities of 18 to 22 tons. To simplify installation, both center and outrigger-style mountings are offered.

Duo-scopic hoists are designed for mounting under Models 12N-3, 12N-4, 12N-5, and 12N-7 Galion Allsteel steel dump bodies. By shifting weight forward, the hoists add up to 1,500 pounds payload.

To obtain Catalog LL-103 write to the Galion Allsteel Body Co., Galion, Ohio, or use the Request Card at page 18. Circle No. 390.

Heil Picks Two to Head Sales Departments

Responsible for the over-all direction of the government, export, and road machinery sales department of the Heil Co., Milwaukee, Wis., is Harlan Stoller. During his 26 years of service with the company, Mr. Stoller has served as sales correspondent, general branch manager, and manager of the Heil export department.

The new sales manager of the recently formed government, export, and road machinery sales department is Paul Miller.

Push-loaded by an Allis-Chalmers HD-20, a Euclid single-power scraper picks up a heaping load of impervious material in one of the borrow pits near the job. Average production is 50,000 yards daily.

Tiber Dam

Earthwork hits peak schedule

by RAY DAY

Though hampered by river diversion problems during the early part of 1954, earth embankment work was pushed hard last year at Tiber Dam on the Marias River near Chester, Montana. The dam's $12,800,000 contract, held by the joint-venture firms of Guy H. James Construction Co., Oklahoma City, Okla., and Wunderlich Contracting Co., Omaha, Nebr., includes not only construction of the dam, but spillway, outlet works, and appurtenant structures.

Located 68 miles upstream from the confluence of the Missouri and Marias Rivers, Tiber Dam was started in October, 1952, and was the first part of the Lower Marias unit to reach the construction stage. The Lower Marias is part of the Missouri River Basin project, authorized by Congress in 1944 to provide a comprehensive program for the control of the Missouri River and its tributaries.

Tiber Dam, a rolled earthfill structure rising 206 feet above stream bed, is expected to be completed by December of this year. Its main dam section has a crest length of 4,300 feet, with a 17,000-foot dike extending from the right abutment. Tiber Reservoir, with a capacity of 1,397,000-acre-feet and a surface area of 22,720 acres, will extend 25 miles upstream from the dam and have a maximum width of 4 miles.

Earthfill Design

Generally following USBR plans for earthfill structures, the dam has a center impervious zone of highly compacted silty clay, flanked by similar sized zones of semi-pervious material. These, in turn, are flanked by broad heavy embankments of pervious sand and gravel found near the dam site. The 17,000-foot Tiber Dike, which will prevent the reservoir from passing through several higher coulees, will be about 60 feet high at its widest point. Similar in construction to the dam, it has only two zones—an impervious clay core flanked by layers of pervious gravelly material.

The permanent outlet structure consists of a 14-foot circular concrete-lined tunnel, about 1,700 feet long, which leads under a heavy shale formation at the base of the dam. Its capacity is about 2,500 cfs for diversion purposes.

The spillway is a reinforced-con-

(*Continued on page 38*)

One of the contractors' service crews replaces a cable of the Bestland Rockmaster rock picker. With the site 70 miles from a supply city, good equipment upkeep is vital.

On the fill, Gebhard sheepsfoot rollers pulled by Allis-Chalmers HD-21's compact impervious material going into the dam. Fill is compacted in 6-inch lifts.

Tiber Dam

New techniques employed in grouting

A new method of dry-hole drilling followed by pressure grouting in shale rock, now being used at Tiber Dam, promises to revolutionize pressure-grouting techniques used on U. S. Bureau of Reclamation contracts.

This drilling work is being done as part of the $12,800,000 construction contract for Tiber Dam, held by the joint-venture combine of Guy H. James Construction Co., Oklahoma City, Okla., and Wunderlich Contracting Co., Omaha, Nebr.

The method was probably first used at Boysen Dam, Wyo., where heavy blocky sandstone and siltstone formations were successfully grouted. But until the time work got under way at Tiber, shale was simply a formation which no one thought of sealing with pressure grout simply because shale usually will not take grout.

Bedrock at the Tiber Dam location consists of a bedded Colorado shale, open and seamed in some places on the abutments. A considerable amount of gypsum is in evidence, especially on the left abutment where the formation of these crystals is pronounced. Preliminary tests made in the exploration stage indicated that the rock would take grout if low pressures were used so that the bedded shales would not break out.

Test injections were made with water. Finally, a grout hole was drilled which took over 1,700 sacks of cement. Core recovered from grouted areas showed beyond all doubt that the cement slurry had penetrated into the shale formation to make a watertight seal.

It was through this trial-and-error work that present grouting systems evolved. This led to the belief that the left abutment, particularly, could be successfully grouted by compacting the earthfill against the rock face so that it would act as a restraining diaphragm and hold the grout inside the rock.

Drilling Methods

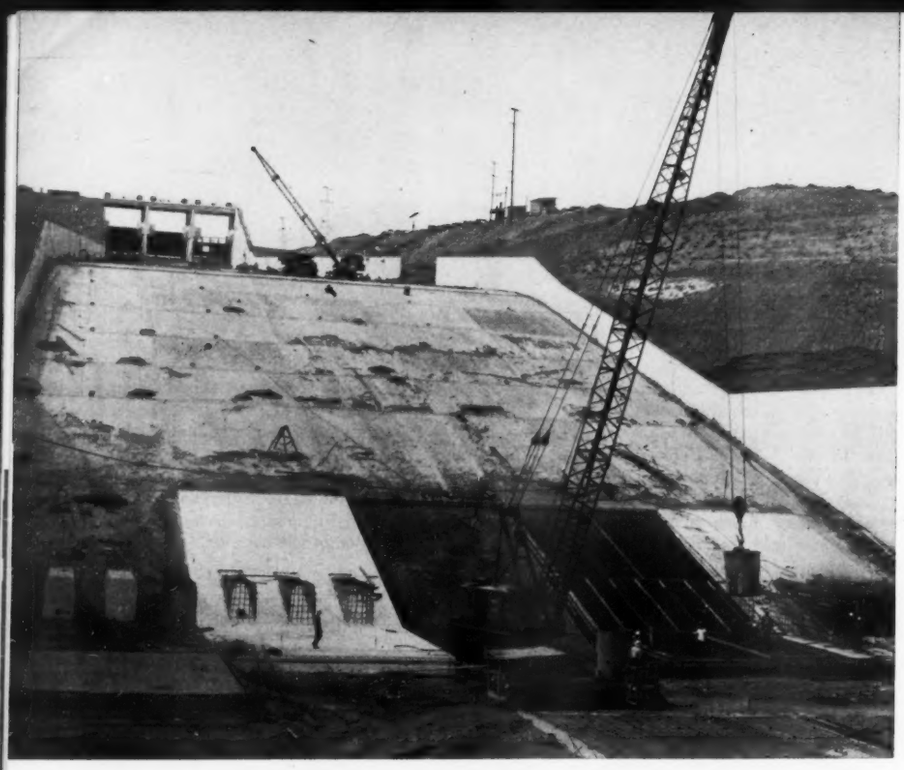
The contractors are using a Chicago Pneumatic rotary diamond drilling machine with EX-type bits and drill steel up to 150 feet long. This steel is in 10 foot lengths. A unique method of dry-hole drilling makes the grouting more efficient. If the conventional water method were used with powdered shale, the effect in the seams would be a great deal like injecting bentonite, according to USBR engineers. By drilling the holes dry, the powdered cuttings can be blown to the surface so that fissures in the rock are exposed and can be penetrated with grout.

These grout holes are being drilled approximately 80 feet apart along the left dam abutment to a point 30 to 50 feet below the surface of the earthfill. Additional holes are drilled as close as 10 feet apart, depending on the take. The machine has even drilled down through compacted impervious earthfill, but it has been necessary to case holes going through pervious overburden. Grouting is done by the conventional packer process. With the earthfill acting as a barrier against the rock face, the fissures are being well grouted.

No attempt is being made to pressure-grout the bedded shale underneath the dam, since it is dense and has a minimum of seams. Test grouting has shown no take in this area. Engineers do not believe that the seepage will be great enough to require such a program. Settlement gages have been placed in the dam foundation to record certain characteristics of the fill as time goes on.

When Tiber Dam is completed and goes into operation in December, 1955, credit for much of the safety against seepage under the dam itself can be claimed by the new dry-hole drilling and grouting method used in the construction of the dam.

THE END



Concrete is delivered to forms at the spillway toe by a Bucyrus-Erie 54-B crane with Gar-Bro bucket. Near the top of the spillway, a Lorain Moto-Crane works on the backfill. *Ray Day Photo*

Tiber Dam

Special retardant introduced in spillway concrete

A new set-retarding agent which may prove important in highway work and other types of flat-slab concrete construction is being used experimentally in the large open-concrete slabs of the Tiber Dam spillway channel. The agent is a brownish powder known as ABL-50, and it was developed from sulphated lignin, a pulp mill product, in the Denver laboratory of the U. S. Bureau of Reclamation.

There, USBR engineers, knowing

●TENNANT Sweeper cleans 48" path; replaces 3 to 12-man crew.

New Compact Machine Sweeps Gutters Walks and Alleys at 1/5 Usual Cost

BY SWEEPING congested areas with a new type power sweeper instead of pushbrooms, Akron, Cleveland and several other cities may save up to 80% this year in labor costs.

The new sweeper, shown at the APWA meeting in New Orleans last fall, is a compact heavy-duty machine. It cleans a 48" path and turns easily in a 5-ft. radius.

Its sweeping capacity is reported to equal that of a 3 to 12-man pushbroom crew.

Sweeps Cleaner Than a Crew

The sweeper has a powerful brush-and-vacuum system which eliminates need for water spraying or "wetting down." A rotating curb-brush sweeps leaves, dust and litter into main path of the machine.

A 36" brush, in a vacuumized compartment, throws dirt forward into an enclosed 9 cu. ft. hopper. Sweeping speed, with 2-speed transmission, is 1½ to 8 MPH.

Pays For Itself In 6 Months

The new sweeper has proved most successful in "mechanizing" whitewing work in special congested areas where big sweepers can't be used—such as gutters in downtown areas, walks, alleys, garages, driveways, etc.

In such areas a single machine is said to pay for itself in 1 to 6 months.

Air terminals, auditoriums, piers and parking lots also can be swept most economically this way.

For details, please write or wire to the G. H. TENNANT CO., 2534 N. 2nd St., Minneapolis 11, Minnesota.

that certain organic substances mixed in concrete would retard set, have been seeking a setting agent which would give concrete finishers more time to do their work.

Both the USBR and James-Wunderlich, the joint-venture firm constructing Tiber Dam, are cooperating in its use on the project. The agent was first used at Tiber Dam last year, when most of the spillway concrete was completed.

Though the set-retarding agent which has been developed may not prove suitable for concreting in all types of weather, experiments now under way do show promise. When added to a concrete mix, the material seems to slow up initial set without adversely affecting the ultimate strength of the concrete.

The men on the Tiber job point out that the use of the material requires sound judgment. Moreover, it should be used only for its designed purpose—retarding concrete set under emergency conditions. These men emphasize, too, that the agent has not yet reached final development.

The retardant appears to cause a slight increase in bleeding, and it also seems to affect the air-entraining content of the concrete. But it causes no apparent discoloration and, in general, seems to do its job well.

Concrete Techniques

Another James-Wunderlich innovation at Tiber Dam is the use of high lifts in placing concrete for the spillway walls. In the past, it has been usual to break the construction joints at centers approximating 5 to 10 feet in height. James-Wunderlich use only one construction joint in a wall 48 feet high.

In making 24-foot pours, as in making 10-foot pours, a crane was needed to handle forms for the lift. But the labor costs in setting forms for a 10-foot pour are greater than the 40 per cent labor costs on a 24-foot pour. Thus, almost as much money is required to get set for the lower lift as is required for the higher lift.

For the forming job, the joint-venture firm developed high and extremely heavy wooden forms consisting of 3×6 studs with double 3×6 wales. The surface of the forms was 2-inch material with a tongue-and-groove joint so that the surfacing could be reversed if necessary. Held in place by high-tensile form bolts, the panels were exceptionally sturdy. Every form on the job was used at least twice, and some were used as much as 23 times. Battered walls were also formed in high lifts. The main spillway walls have a top width of 12 inches and battered outward toward the bottom at a rate of ¼ inch per foot in the stilling basin and ⅜ inch per foot in the crest.

Form panels were made in a central carpenter shop, trucked to the job, and erected by either a Northwest 80-D crane, a Bucyrus-Erie 54-B crane, or by a Lorain truck-mounted Moto-Crane. The latter machine was used as a "cherry picker" to do all the odd jobs around the spillway.

Most of the concrete was transferred to forms by either the Bucyrus-Erie 54-B or the Northwest 80-D, rigged as cranes and handling 2-yard Gar-Bro and Johnson concrete buckets. The material was fed through hoppers and elephant trunks to its point of placement and vibrated by Chicago Pneumatic internal-type vibrators. A Chicago Pneumatic internal vibrator also was used on a screed board for finishing off the surfaces of concrete slabs. The final finish was applied by wood float.

Relief Wells

The Bureau of Reclamation also is using a rather unique weep hole relief well in the concrete slabs to help dissipate any water pressures that may develop under the slabs. They lead down through the slab to pervious gravel and sand drains underneath the spillway concrete. The slabs are joined together by copper waterstops and dowel bars embedded in the concrete.

Original plans did not call for copper waterstops, and when a change order arrived, many of the footings and adjacent pours were set up and some concrete had already been placed. This meant that some means had to be devised to make a horizontal saw joint in the concrete so that the copper waterstops could be inserted and sealed tightly with asphalt compound.

This job was done by the concrete crew, which adapted an air-powered SkilSaw so that a concrete cutting blade could be used. This machine, rigged on a small portable truck, did a creditable job.

Concrete Mix

Concrete aggregates are produced on the project. Raw pit-run gravel for the 3-inch-minus material is hauled in from borrow pit M, which contains every gradation of aggregate necessary for a concrete mix.

The aggregate plant consists of a series of "Seco" vibrating screens, connected by Cedarapids and Barber-Greene conveyors. The finished product is rescreened and sent to the weigh bins of a Noble full-automatic batch plant which does the concrete proportioning. This plant, equipped with two 500-barrel cement silos for handling bulk Trident brand Type V cement, creates a minimum 3,000-pound concrete at 28 days. Protex air entraining is used. All ingredients are mixed with water by two Model 56-S Smith tilting mixers mounted on the platform directly underneath the weigh scales. Fresh concrete is dumped directly to transfer buckets mounted singly on a fleet of four trucks and hauled to the spillway. Good haul roads are kept free of traffic for this operation. THE END

Working along the right abutment, a Gunderson-Taylor Triplex tamper compacts earthfill to insure a good bond between fill material and the rock.

(*Continued from page 34*)

crete channel controlled by three large radial gates having lips which rest on the spillway ogee section. The bottom slab of the spillway pitches downward sharply on a 3 to 1 slope so that fast-flowing water will dissipate its energy in reinforced-concrete baffles at the foot of the stilling basin. Rock is so scarce in this part of Montana that it was necessary to go 90 miles to get good derrick stone to prevent erosion at the foot of the spillway. This material plus stone to face the dam and a portion of the dike was hauled to the site by a fleet of from 15 to 20 Schonrock trailers.

Earthwork

During the 1953 season, the job was flooded out by water which roared down the Marias River at a rate of 30,000 cfs. Last year, a 70 per cent above-normal snow pack in the Marias River watershed kept the reservoir pool at a stage high enough to interfere with construction operations until late July. Despite this, earthwork to date has been rapid.

River diversion for embankment construction has been done in two stages. Prior to any actual diversion, a low flat bench to the left of the river channel was excavated to elevation 2817 in 1953. During this stage the cutoff trench, 200 feet wide at its broadest point along the bottom of the foundation, was ripped into shale bedrock. This was backfilled with impervious material to elevation 2875, and the entire dam fill, 1,700 feet wide at the base, was also put into that elevation. While this work was in progress, the river was held in its normal channel until the outlet tunnel was constructed.

The first stage of diversion occurred early last spring when a low cofferdam was used through the river outlet tunnel. During this time, the river channel section of the dam was excavated and fill placed to elevation 2830. The cofferdam was then breached and the river was allowed to flow back into its channel and over the newly constructed portion of the dam until the spring flood waters had passed.

The second stage of diversion began last July when the cofferdam was replaced, forcing the river back into the outlet tunnel.

By September, 1954, work on the earthfill structure was going forward at a normal production rate of about 50,000 cubic yards per day. On peak days, 60,000 cubic yards of material was placed. The work was being done in two 9-hour shifts, six days a week.

Impervious material for the center No. 1 zone is being dug from borrow pit E, which has a large deposit of silty clay with a dry in-place density ranging from 105 to 115 pounds per cubic foot. Optimum moisture content of this material ranges from 14 to 19 per cent and in all cases it is being put in the dam about two per cent on the dry side. This and other borrow pits were irrigated by ripping the formation to the depth of a ripper tooth and installing Rain-Maker sprinkler heads, irrigation pipe on 40 foot centers, and 6-inch water delivery lines leading uphill from the river. At one time, four big pumps were throwing almost 20,000 gpm of water into these various pits. In one place, a Worthington driven by a 300-hp Cummins diesel engine, and a Western driven by a twin GM engine, supplied 8-inch delivery lines leading to the top of a hill.

Excavation in borrow pit E is being

done by a fleet of equipment loaded by a Model 1055 P&H dragline equipped with a 5-yard Hendrix open-type bucket. This dragline loads four 15-yard Euclids and four 25-yard Euclid 9-LDT's. Also assigned to this borrow pit are eight Euclid single-power scrapers, two Allis-Chalmers HD-20 push tractors, a D8 Caterpillar tractor and dozer for cleanup work, and one Caterpillar No. 12 motor grader which maintains haul roads.

Both the semi-pervious and pervious zone materials are being moved from borrow pit M in the reservoir area, an almost unlimited gravelly to semi-gravelly deposit. The semi-pervious material is being handled by a P&H 1055 shovel carrying a 4-yard Esco dipper. Digging against a 15-foot bank, it loads 25-yard Euclid 9-LDT hauling units.

A total of 28 Euclid 9-LDT's work in this borrow pit. These are bottom-dump units with standard transmissions, capable of moving fully loaded down the haul roads at speeds up to 35 mph. Euclids not used under the P&H 1055 shovel are loaded by a pair of Euclid 54-inch elevating loaders, each of which is pulled by two Allis-Chalmers HD-20 tractors. Each Euclid loader, operating in a circular pattern so that no time is lost in turning, takes from 38 to 42 inches off a lift. Two Sierra loaders serve as standby units.

Haul roads, averaging 2½ miles from each borrow pit are maintained by Caterpillar motor graders. At borrow pit M, three No. 12 Cats are assigned to maintaining broad 50-foot ribbons with hard surfaces capable of handling high-speed vehicles with heavy loads. The Caterpillar motor graders operate in high gear as they go through the haul road almost hourly to sweep aside loose pieces of gravel which have fallen from Euclids leaving the pit. Both sides of the haul road have sizable windrows of this material.

On the fill, compaction equipment includes seven large Gebhard sheepsfoot rollers and a 50-ton Southwest compactor pulled by Allis-Chalmers HD-20's. Two Allis-Chalmers HD-20 tractors, with pusher blocks, dozer blades, or scarifiers, help loaded equipment get through bad spots and help with incidental work.

Also working on the fill are five Caterpillar D8 tractors equipped with bulldozers and scarifier scratchers, a No. 12 Caterpillar motor grader, and a D8 tractor pulling a Bestland Rock-master rock-picking machine. This machine is used on the various zones for picking out oversize rock. Water is hauled by two special 11,000-gallon shop-built water tanks mounted on 9-LDT Euclid tractors. Water is delivered under pressure by a Jaeger 400-gpm pump driven by a General Motors diesel.

The earthfill material for zone 1 is compacted in 6-inch lifts. Semi-pervious material is also compacted in 6-inch lifts at approximately the same moisture content as impervious material. The pervious lifts are compacted with four passes of a tractor after being saturated with water. The water treatment also helps fine particles to sift down between coarser pieces of gravel.

In order to get a tight joint between the earthfill and rock abutments, the contractor is using several Gunderson-Taylor Triplex tampers

(*Continued on next page*)

A two-man crew with Barco units tamps impervious material near the settlement gage while scrapers in the background keep up with the fast earthmoving schedule.

(Continued from preceding page)
and an Ingersoll-Rand compressor. Two labor crews—the daylight shift being slightly larger—are being used with the equipment.

The methods used in the construction of the dam are also being used on the 17,000-foot dike section. Much work on the dike was done early last year during the period of high water at the dam. Both dike work and the dam will be completed in the current season.

Equipment Maintenance

Because the construction season lasts only eight months and because the working site is extremely remote, the contractor set up a good equipment-maintenance program at the dam. In this remote location, 70 miles from Great Falls by dirt roads, it is necessary to maintain an adequate stock of spare parts and give each piece of equipment good service.

A fully heated and winterized heavy-equipment repair shop is located in a 180 × 80-foot Butler building. Inside, heavy steel supporting members carry a traveling overhead 3-ton crane which reaches any part of the main building. This shop accommodates up to ten pieces of heavy machinery at one time.

Just off this main building are several subshops. One 20 × 80-foot stall is used as a welding shop; another section is set aside for rebuilding motors and transmissions. Under an arrangement with Firestone Tire & Rubber Co., one area is used as a tire-repair headquarters. In a parts-storage shop and an auxiliary parts-storage shop, the contractor maintains a large inventory.

A Motorola two-way radio system, used efficiently to coordinate construction operations as well as equipment maintenance, ties the job together. Equipment upkeep generally follows manufacturer recommendations. Engine-oil changes are made between 80 and 100 operating hours, and regular lubrication is provided between shifts by three mobile service units. One stationary lubrication center services nearby equipment between shifts. Five mobile repair units on the job consist of a 2-ton truck, welding equipment, and heavy equipment tools. A special trouble-shooting rig consists of a welding machine, a few tools, and a pickup truck.

A force of 80 men, including warehousemen, stockroom men, mechanics, lubrication men, and supervisory personnel, is required for the two-shift maintenance program.

Aside from influencing maintenance procedure, the remoteness of the Tiber Dam site has had an effect on the construction camp. James and Wunderlich own approximately 68 trailers where workmen live with their families. And at least as many more privately owned trailers are in the camp. In addition, the USBR has erected temporary housing facilities on the site, together with a job mess hall and commissary. A grade school at the site rounds out community facilities at the dam.

Personnel

Tiber Dam and its appurtenant works are under the general supervision of L. N. McClellan, chief engineer of the USBR in Denver. Local adminstration of the project is under Region 6 at Billings, headed by F. M. Clinton, regional director. Harold Aldrich, at Great Falls, is supervising engineer; W. A. Sanford, at the job site, is construction engineer; T. E. Mann is field engineer, and M. C. Wren is assistant field engineer; and George Bailey is office engineer.

The contractors' operations are under the general supervision of F. A. Bleecker, project manager. John New is general superintendent; Pat Stewart, assistant grade superintendent; Ray Spitler, concrete superintendent; A. C. McDaniels, assistant concrete superintendent; Jim Williams, chief engineer; Fred Beavers, equipment superintendent; and Walter Aman, office engineer.

Purposes of Program

Tiber Dam is part of the Lower Marias unit, which will eventually irrigate 127,000 acres of dry land in Hill, Liberty, and Chouteau counties. Landowners in the project area formed the Marias Irrigation District June 7, 1950 to conduct business affairs of its members, including entering into a contract with the federal government for repayment of irrigation costs. At the present time, 229 farms operate in this area. When every acre is placed under irrigation in 1967, it is expected that 991 farms will be operating on the project. The Lower Marias unit will also provide flood control for the Marias Valley and other downstream areas in the Missouri River Basin.

Two power plants are being considered as an addition to the dam. The intake tower and penstock are being constructed to provide for the installation of a 2,000-kw power plant at the dam, and another power plant, with a 1,600-kw capacity, will be constructed at a drop on the main canal.

A canal outlet works, located adjacent to the left abutment of Tiber Dam will lead from the reservoir to the irrigation system of the Lower Marias unit. Known as the Marias Canal, it will be about 77 miles long and will have an initial capacity of 2,200 cfs at its head. This is equivalent to 1,422,000,000 gallons every 24 hours —enough water to supply New York City's 7,890,000 inhabitants with water for a day.

Other major canals will have a combined length of about 140 miles. Drainage and waste water from a portion of the project will be recollected in Lonesome Lake Reservoir, which will have a 20,000 acre-foot capacity and will provide water for a part of the project lands.

The estimated total cost for the construction of the Lower Marias

unit is $64,300,000. Of this total, $21,380,000 will be repaid by farmers whose lands benefit from irrigation. Flood-control benefits are estimated to be about $5,500,000. The remainder of the cost will be returned to the federal government from other sources of revenue for the Missouri River Basin Project. THE END

Mezger Heads Reopened Vickers Sales Office

The St. Louis, Mo., district sales office of Vickers, Inc., Detroit, Mich., has been reopened to provide added application engineering and service assistance to the oil-hydraulics market in the midwest.

Robert H. Mezger has been appointed sales manager for the district. Mr. Mezger has been with the firm since 1942.

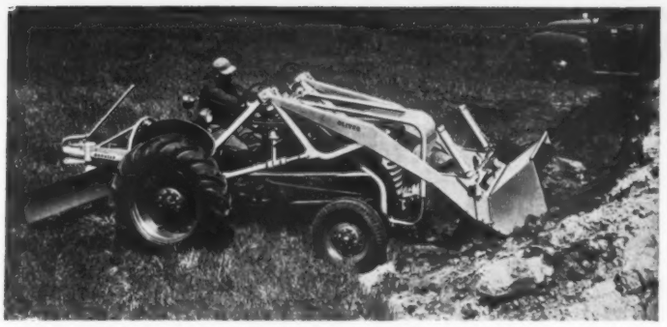
How-To-Do-It Booklet On Scaffolding Problems

■ A catalog on Adjustomatic Special scaffolding features a how-to-do-it section that answers some common scaffolding questions. The information applies not only to Adjustomatic Special scaffolding but to most other scaffolds as well.

Some of the data covers how to scaffold chimneys and stacks, how to scaffold corners and place platforms, how to arrange bracing, and how to level scaffolding.

The literature also illustrates a variety of Adjustomatic Special panels, braces, and accessories.

To obtain Catalog No. 1054 write to Automatic Devices, Inc., 6107 Bartmer Ave., St. Louis 14, Mo., or use the Request Card at page 18. Circle No. 355.



The new Oliver Super 55 takes all mounted equipment—front, rear, or side. A 3-point hitch is operated from the tractor seat by a built-in hydraulic system. Front or side-mounted equipment is operated by an external control valve from the same hydraulic system.

Small Wheel Tractor

■ A new four-wheel tractor with low profile and short wheelbase is announced by Oliver Corp., 400 W. Madison St., Chicago 6, Ill. Hood height of the new Super 55 tractor is only 4½ feet, and wheelbase length is 73 inches. Without attachments, the tractor weighs about 3,000 pounds. It is offered with either a diesel or gasoline engine.

The Super 55 has a number of innovations in standard equipment for a tractor its size. One of these is a 6-forward-speed transmission with a super-low gear capable of speeds from ¾ to 1½ mph.

Another standard feature is the built-in hydraulic system with fingertip control for the 3-point hitch. The Super 55 is designed to accommodate 3-point hitch, front or side-mounted attachments of all makes meeting standard specifications.

Provided as special equipment is the Oliver independently controlled rear power takeoff that permits tractor starts and stops without interrupting power.

For further information write to the company, or use the Request Card at page 18. Circle No. 282.

Sales and Service Manual On Gasoline-Powered Tools

■ A comprehensive Mall Tool Co. sales and service manual has just been released. The manual describes every type of gasoline-powered chain saw available and explains how each is best operated. It provides service advice on all Mall gasoline-powered products including chain saws, trowels, vibrators, and generators. The manual also lists prices and discounts to dealers on all parts.

A collection of bulletins issued by the Mall Tool Co. over a 7-year period is included in the manual. Mall dealers and authorized service agencies may obtain the manual for $7.50, which includes a one-year mailing service on new and revised bulletins. Write to Mall Tool Co., Service Dept., 7725 S. Chicago Ave., Chicago 19, Ill.

Bulletin on Truck Crane

■ A new bulletin on the P&H Model 105 TC truck crane is available from Harnischfeger Corp. Known as the P&H Miti-Mite, this model, available only on its own precision-built carrier, is rated at a 10-ton crane capacity. It is easily converted to all other services, handling standard buckets at efficient boom lengths. For scrap-yard service, the 105 TC swings a 39-inch magnet.

To obtain Bulletin TX-159 write to the Harnischfeger Corp., 4610 W. National Ave., Milwaukee 46, Wis., or use the Request Card at page 18. Circle No. 283.

New standardized air force hangar 270×350×66 feet provides unobstructed area for work, various shops

Double cantilever design meets bomber requirements

A new concept of aircraft hangar design, the "double cantilever," is being used on a number of maintenance and repair structures being built at U. S. Air Force bases in the Southwest. While similar in design, the hangars vary from three to six stories in height and cost between two and four million dollars.

One of the largest was recently completed at Travis Air Force Base, Fairfield, Calif., by the Zoss Construction Co., Portland, Oreg. and Hollywood, Calif. Essentially, this huge building has a structural steel frame consisting of a pair of longitudinal trusses supported on columns at both ends. Measuring 270×350 feet, it is 66 feet high, covered with corrugated metal, and insulated with asbestos. The cantilevered roof trusses, which project as much as 93 feet from supports, are perpendicular to the longitudinal trusses. The cantilever type of roof construction is unsupported along the outer walls. Hangar doors, reaching almost the full height of the building, provide as much as 64 feet of clearance.

The huge amount of space in the hangar solves the problem of providing housing for the country's largest bombers when they are repaired and maintained. Shop areas, located on the ground and upper floors, provide ample space for work on armament, parachutes, electronic and hydraulic units. Classrooms, tool rooms, storage areas, offices, and other facilities are also located inside the structure.

Continuous trusses are used for longitudinal members, since lack of a uniform soil structure at Travis, as at most of the other bases, makes it probable that the structure will settle unequally. At Travis, soil is made up of alluvial silt and black clay. Twenty test borings, and four bearing tests made at the approximate elevation of the bottom of the footings, showed soil conditions varying widely in a distance of 100 to 200 feet. One end of the hangar and the adjacent parking apron are built on sandstone; the other end of the hangar rests on an alluvial deposit. Because of time and cost factors, piling was ruled out as a support for the structure, and simple reinforced-concrete foundation slabs were used. The main foundations are 22×22 feet, and smaller footings are 14×14 feet. Depth of excavation varied, but corner foundations were excavated to a depth of 8 feet.

Two mobile cranes, an American in the foreground, set 35×64-foot door panels in place for the Travis AFB maintenance hangar. The panels run on railroad tracks cast into the floor, and are supported at the top by guide rails.

Concrete Operations

Rainy weather set in as the footings for the hangar were constructed and, to keep operations moving, the contractor poured the floor slab before erecting steel. The floor, consisting of a 14-inch slab of concrete in the main hangar and a 16-inch-thick slab at the hangar aprons, was placed in checkerboard fashion. This sequence of operations simplified the problem of supporting falsework for the structure, since it could be skidded from place to place as needed. Even though no special protection was provided for the slab, only minor surface damage, caused by rivets discarded by workmen, has occurred.

Maximum drainage was provided

CIMCO TWIN BINS CUT COSTS FOR CONTRACTORS

These aggregate weigh batchers help the contractor who needs to cut the cost of placing concrete. There is a constant flow of materials from loader to Twin Bin to mixer to forms. This eliminates the need for huge loading cranes and storage bins.

There is a low-priced twin bin for 68-118-168 mixers. Any low-cost loader can be used with Twin Bins.

A Model BW Twin Bin is shown above with loader and 118 mixer—doing the job of 10 men.

The Bridge Contractor cuts costs 5 ways: He mixes his own concrete, uses his regular crew, mechanizes the pour, uses portable equipment and reduces costly breakdowns.

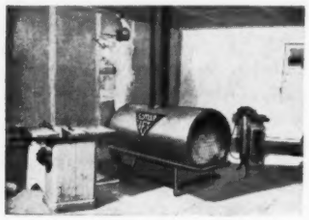
Cimco says, "There is plenty of time to weigh out any batch needed for up to a 168 mixer during the regular time used to mix a batch of concrete."

When the concrete is mixed, there is a Cimco concrete handling bucket to place it into the forms.

CIMCO JETS

This line of blowers, air dryers, heaters and ventilators can help the contractor stretch the work year, safeguard health, increase production and cut job costs.

Cimco says, "Blowers move hot or cold air to where it is needed to dry concrete, plaster or paint. Several types in Air Dryers and Ventilators give contractors new tools for pushing work in confined areas, where damp, stale air or odors hold up the job. Exhausters pipe off 'Killer' gases from machine exhausts in any shop."



A CIMCO Jet portable unit heater is shown in a building, doing two jobs—space heating and drying. It is indirect-fired, with gases being piped away for 100% pure air delivery to the job. For 100% heat, gases produced may be reused, where contamination is no problem, as in bridge floor heating. Contractor can save money by keeping heat on the spot or in the area where men, machines and materials are located. Heating capacity reaches nearly ¾ million B.T.U.'s. You get *year around* production.

For complete information on all Cimco products, write this magazine or CIMCO, Box 422, Marshalltown, Iowa, U.S.A. A few dealer territories are still open.

for the parking aprons by placing concrete in lanes which extend outward from the hangar at a slight slope. Lanes were placed in 20-foot-wide slabs. Altogther, a total of 2,500 tons of asphalt surfacing and 16,000 cubic yards of concrete was used in pavement laid around the hangar.

Steel Erection

Steel work began at one end of the building and, after the office and shop section were set up, the first two main columns were set in place. The main trusses, shop-assembled before shipment, were completely assembled at the site. After the trusses had been erected, workmen began riveting them at one end, working toward the opposite end. After the first pair had been riveted, except for the bottom chord connections, cantilever-truss erection started at one end of the hangar.

These trusses, weighing 35 tons, were lifted into place by Moore Dry Dock Co., Oakland, Calif., a subcontractor. The members were hoisted 65 feet 10½ inches into place by 20-ton cranes.

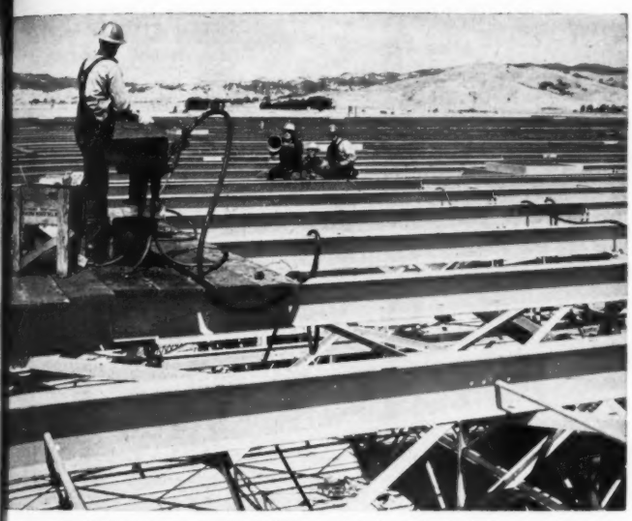
Supporting columns were spaced so that they provide a minimum obstruction to aircraft maneuvering in the huge building. Near the center of the hangar, the detailing of supporting columns and trusses followed standard practice for bridge construction.

Transverse roof trusses were connected across the main truss to increase stability and provide sway bracing. Each transverse truss was located at the panel points of the main trusses. At each pair of columns at the ends of the main trusses, sway bracing, which will take the total wind load of the building, was installed. The arches, 100 feet across, have steel column supports.

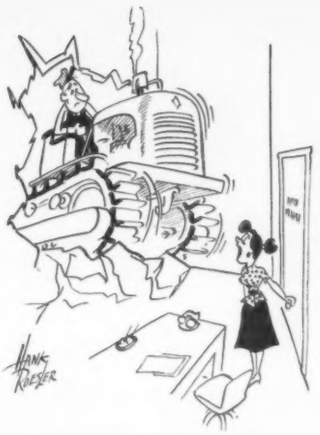
The hangar doors cover the full length of the building on both sides, running on railroad tracks cast into the floor and supported by guide rails at the top. Doors on each side consist of twelve panels which roll back into a pocket along the side wall. Each panel measures 35 feet in width and 64 feet in height. Individual motors operate the doors, which are controlled by push buttons at the ends of the structure. Erection was handled by three mobile cranes which "duck-walked" the doors to the hangar and set them in place. This operation required 2½ days.

Inside the hangar, a traveling crane, capable of lifting entire aircraft engines, moves along a track which runs from one end of the building to the other. A $200,000 deluge system protects the building and any aircraft it houses. This system, with a 750,000-gallon reservoir, is supplied by four pumps with a 2,500-gpm capacity. Both manual and automatic operation is provided for the apparatus.

This standardized type of hangar currently is being erected at a number of other Air Force bases, in California, including the Castle base at Merced, the Mather base at Sacramento, and March base at Riverside. Edwards AFB near Muroc Dry Lake and George AFB at Victorville, also in California, are expected to be furnished with similar installations. The largest such hangar now being constructed, at Castle AFB, covers nearly five acres of ground and will be capable of housing as many as five B-36 bombers. Construction of all these hangars is being handled through the South Pacific Division, U. S. Army Corps of Engineers. Col. Edwin M. Eads, Air Force installations representative, South Pacific Region, is in charge of the projects. THE END



A riveting crew, working from one end of the building to the other, drives rivets for the roof members. The structure, costing about $2½ million, is one of several being built at Air Force bases in the southwest.

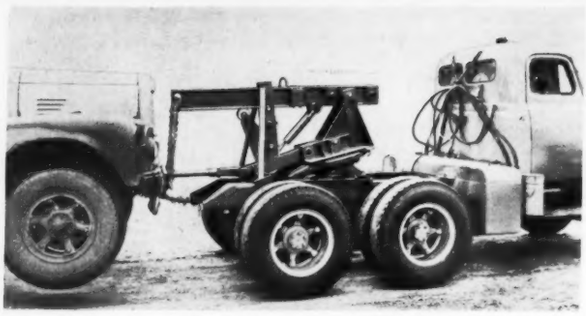


"Whom shall I say is crawling?"

Pre-Engineered Buildings Illustrated in Bulletin

■ The versatility that pre-engineered steel buildings offer is the chief fact stressed in a new booklet from the Brookville Mfg. Co., Brookville, Pa. The literature shows installations of the Brookville all-steel insulated buildings serving as schools, airport buildings, stores, manufacturing plants, machine shops, and warehouses. General specifications are listed.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 357.



The Big Ben fifth-wheel carrier helps to get payloads back on the move after breakdowns.

Hoist on Fifth Wheel Keeps Payloads Moving

■ When a truck-tractor breaks down, the load can be continued on its way quickly with the aid of a special hydraulic hoist made by the H. S. Watson Co., 1316 67th St., Emeryville 8, Calif. The Watson-Big Ben carrier hoist mounts on the fifth wheel of the truck-tractor that pulls the relieving tractor to the site of the breakdown. On the return trip it is used to haul the disabled truck-tractor.

The device can be operated by one man and can be installed in about 10 minutes. It fits any fifth wheel using a standard SAE kingpin, and handles any truck-tractor with a hydraulic lift reaching 15,000 pounds.

For further information write to the company, or use the Request Card at page 18. Circle No. 284.

Folder Tells Advantages Of Concrete Additive

■ A folder describing the use of low heat Pozzolith in mass concrete to reduce total heat evolution is available from The Master Builders Co., 7016 Euclid Ave., Cleveland 3, Ohio. The literature outlines the advantages of the additive in concrete in both the plastic and hardened state, the various types and adaptations of the product, and the design of Pozzolith concrete. The additive's use in mass concrete is covered, as well as its use in concrete for structures and flat slabs placed in hot weather and in tropic and semitropic areas.

The folder includes a comparison of Low Heat Pozzolith mixes with plain and air-entrained concrete mixes.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 382.

How Lift Trucks Were Used On Bridge Precasting Job

■ A new field report describes the profitable handling of precast-concrete for bridges with the use of Hyster RT-150 and YT-40 lift trucks. The illustrated report is an actual case history of labor-saving handling and describes special construction methods used in conjunction with the Hyster units. Photographs show in detail how the lift trucks were used in the precasting operation.

To obtain Field Report No. 52 write to Hyster Co., P. O. Box 4318, Portland 8, Oreg., or use the Request Card at page 18. Circle No. 374.

Folder on Framing Anchors For Floors and Ceilings

■ What is described as a fast simple way to level floor and ceiling joists without notching or shimming for ledgers or strap hangers is outlined in a new folder from the Timber Engineering Co., 1319 18th St. N. W., Washington 6, D. C. The literature illustrates the use of Teco Trip-L-Grip framing anchors for floor and ceiling framing.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 377.

Heavy-Duty Engines

■ A bulletin illustrating the 225 to 675-hp LeRoi L3460 and L4000 engines is now available.

Features described include the integral V-12 cylinder block design, the counterbalanced crankshaft, and the hydraulic valve lifters. Charts show the space savings made possible by the integral V-12 design.

To obtain Bulletin E-7 write to LeRoi Division, Westinghouse Air Brake Co., 1706 S. 68th St., Milwaukee 14, Wis., or use the Request Card at page 18. Circle No. 351.

Magnetic sweeping rig helps avoid flat tires

Nails which have come loose from forms are picked up by the Stearns magnet suspended from the bumper of a Euclid tractor.

Using an electro-magnet to "sweep" haul roads, Garrison Spillway contractors reduced tire punctures from an average of 15 or 16 per day down to two or less. Since the machine was introduced on the job, concrete-pouring schedules are being kept and much downtime eliminated. Compared to the cost of damaged tires, the cost of picking up nails with the magnet is trifling.

A strange looking assembly, the sweeper consists of a Euclid tractor with a Stearns magnet, 6 feet long and 18 inches wide, suspended from the front bumper about 6 inches from the ground. Power for the 115-volt 15-amp magnet is furnished by a Kohler 5-kw generator mounted on a small two-wheel trailer towed behind the tractor.

The tractor, which was once a part of a bottom-dump "Euc" combination, alternates between picking up nails and pulling a low-bed trailer which does heavy hauling tasks, such as bringing steel from the fabrication yard to the casting area.

The generator was one of many light plants around the job normally used to provide night illumination. The magnet is the only unit which was purchased especially for this use.

The $13,300,000 spillway contract is for the first stage spillway construction at Garrison Dam on the Missouri River at Riverdale, N. Dak. It includes the construction of 180,000 square yards of spillway paving 18 inches thick, with edges thickened to four feet. Also included are concrete walls along both sides of the spillway, the spillway crest structures —including 28 big tainter gates—and the bridge which will carry a highway across the spillway.

The contractor first paved a 320,000-square-yard area of the spillway slab. This smooth gently-sloping slab was then used as a platform on which forms for the walls and crest structures were fabricated and stored. The spillway bridge members were also precast and prestressed on the slabs. Eight International R-190 trucks, carrying concrete for placing in crest structures and bridge members, travel the length of the slab and back plus about 2,000 feet of haul road. It was this fleet which was hardest hit by the punctures.

Nails, the chief cause of the tire troubles, are being used to construct forms for the spillway walls, crest structures, and bridge members. As form sections are transported from place to place, the nails are distributed widely over the slab and nearby haul roads.

The marked reduction in flat tires came about after the magnet was operated on a regular schedule. During peak operations, it works about 30 hours a week. Using a small hoist, one man raises the magnet and attaches it to the tractor. He then methodically covers every accessible part of the spillway slab and the adjacent haul roads. On the basis of the 60-hour work week prevalent on this project, the magnetic cleanup was about a half-time job for one employee.

Another operation which undoubtedly assisted in removing some of the nails was the regular sweeping of the slab with a Henke power broom pulled behind a truck or pickup. This 7-foot broom powered by a Wisconsin engine keeps the slab free of rocks or other hard objects which might cause damage to the surface if they were run over by the tracks of a crane. Dirt and nails are also swept up by the broom.

Garrison Spillway Constructors is a joint venture of Johnson, Drake & Piper, Inc., Minneapolis, Minn.; Foley Bros., Inc., St. Paul, Minn.; C. F. Lytle Co., Sioux City, Iowa; Donovan Construction Co., St. Paul, Minn.; and Winston Bros. Co., Minneapolis. J. M. Kellogg is project manager, Theo Torgerson is general superintendent, and W. A. Anderson is project engineer for the contractor.

THE END

Traffic moves smoothly through heavy grading job

Vehicles are shunted over both old and new road sections as almost a million cubic yards of material is excavated

Working in one of the big rock cuts in reconstructing a portion of U. S. 40, a Manitowoc shovel with a 5-yard dipper loads a Euclid. Traffic through this 6½-mile stretch remained normal throughout the huge earthmoving job.

Ray Day Photos

Excavating almost a million cubic yards of earth and keeping traffic moving through a road reconstruction project at the same time was one of the biggest difficulties encountered by Morrison-Knudsen Co., Inc., Boise, Idaho, in work on 6.358 miles of U. S. 40 about 15 miles east of Reno, Nevada. The route is one of the state's principal east-west highways, and it had to be kept open for approximately 5,000 vehicles between 8 a.m. and 4 p.m. daily. Making the job even more difficult was the necessity of working around the tracks of the Southern Pacific which passes near the base of some of the cuts.

Morrison-Knudsen, reconstructing the old 22-foot-wide asphalt highway under a $1,300,000 contract from the Nevada Department of Highways, started work last March and expected to finish the job early this year. The new section, which cuts through mountainous terrain in the western part of the state, has two 36-foot-wide roadbeds, each with an 8-foot outboard shoulder and a 4-foot inboard shoulder. The roadway is 24 feet wide. For 70 per cent of its length, the road's east and west-bound lanes are separated by being benched at different elevations. The remainder of the road consists of two lanes separated by a drainage ditch which varies from 2 to 10 feet in width.

The pavement consists of 6 inches of 3-inch-minus gravel base, compacted to approximately 95 per cent modified AASHO density, covered with 3½ inches of 1-inch-minus gravel base having a prime coat. Atop this is 2½ inches of Type II plant-mixed asphalt placed full width over roadway and shoulders. This has a seal coat of asphalt and ½-inch-rock-chips to make the job waterproof.

Heavy Excavation

Approximately half of the 900,000-cubic-yards of excavation required drilling and shooting in granite, obsidian, sandstone, and andesite. The remaining 60 per cent of the work was done in dirt, diatomaceous earth, boulders, sand, and gravel. Morrison-Knudsen used several equipment spreads on this earthwork. One consisted of a Manitowoc power shovel, equipped with a 5-cubic-yard dipper, and assisted by five Euclid A-36 end-dump trucks, each with a 17-cubic-yard capacity. The Manitowoc loaded these machines in three or four passes. Another spread had a Northwest 80-D shovel, with a 2½-yard dipper, served by three Euclid A-36's. At another location, a North-

(*Continued on next page Col. 4*)

Powder holes are drilled fast in a difficult cut by this Worthington drill and compressor, mounted on a Caterpillar D8. The machines moved rapidly from place to place and drilled holes up to 3 inches in diameter at high speed.

A Euclid end-dump deposits material on a fill which a Caterpillar D8 with dozer levels the earth. Lane separation for most of the stretch is achieved by constructing roadways at different heights.

(*Continued from facing page*)

west Model 6 with a 1½-cubic-yard dipper kept two Euclid A-36 machines working.

Unclassified excavation was handled by a variety of rubber-tire equipment, including two Euclid single-power scrapers, two Caterpillar DW10's, and two No. 80 scrapers with D8 prime movers. Auxiliary equipment included three water wagons—one a converted Euclid bottom-dump holding 4,500 gallons—eight Caterpillar D8 tractors for dozer and roller work, two Caterpillar D6's for roller work, and two Caterpillar No. 12 motor graders. A mobile service unit took care of equipment in the field.

The drilling and shooting spread was staffed by two Caterpillar-mounted Worthington compressors and Worthington wagon drills, two Winter-Weiss Portadrills, and several portable compressors in the 315-cfm class.

Drilling and Shooting

Excavation near the Southern Pacific railroad tracks required a considerable amount of precise light drilling and shooting. In heavier rock formations, deep drilling and heavy shooting was needed. For the very heavy shooting necessary in lava and sandstone, the Winter-Weiss Portadrills were used. The new Winter-Weiss drill bit, which provides a 6½-inch-diameter hole, was used in lava and the 4¾-inch bit was used in sandstone. Working with the regular Winter-Weiss drill stem, the drills sent holes as deep as 60 feet below the surface. Where shallow lifts were to be blasted, a 3-inch-diameter hole sufficed. In general, hole centers were spaced 5 feet apart in lava, and from 7 to 8 feet apart in other materials.

Two of the most useful rigs consisted of Worthington air compressors and Worthington wagon drills, mounted on Caterpillar D8's. These machines moved rapidly from place to place and drilled holes up to 3 inches in diameter at high speed.

Drilled holes were column-loaded with Atlas powder, and if slope lines were involved, Atlas delays were set on a graduated scale leading from the center of the cut toward the top of the slope. Where wet ground was a problem, Atlas stick powder in velocities up to 65 per cent strength was used. Approximately 30 per cent of the powder expended on the job was the stick type. The remainder consisted of Amodyn, also made by

Atlas. When the job was well under way, explosives were being used at the rate of about 0.7 pound per cubic yard of rock.

Diverting Traffic

Since much of the new highway either parallels the old road or runs through the original alignment, traffic had to be shunted off the road while heavy cuts were opened. In making one deep cut 60 feet above the old road, the contractor used shovels and Cats to pioneer the first bench of material, then detoured traffic through this cut while power shovels moved back to work on the original road. After the old section had been brought to grade, traffic was routed over it while operations were resumed in the cut.

In another cut, 130,000 cubic yards of solid rock had to be removed from above the Southern Pacific railroad track. A safety fence made with No. 9 gage wire was erected on part of the slope, and light shooting loosened rock along the edge of the cut. As the material was excavated by a shovel, a spotter kept watch for material that might become dislodged. Though the process was slow, project manager R. J. Jones moved 190,000 cubic yards of material in one month with a spread of equipment working two 8-hour shifts five days a week.

Blasted rock hauled from shovels by end-dump Euclids was placed as fill material. These fills were compacted by loaded rubber-tire hauling equipment, then topped by better material.

Grade Changes

Perhaps the most perplexing part of the job occurred in a deep cut high on one of the mountains, which consisted of fractured lava rock over a soft formation. This material, quite free of dirt, was loaded into two Euclids by a Manitowoc and hauled to a 1,000-foot stretch of fill near Mustang Station. When the material had been placed in a 12-inch-thick ribbon, rollers moved in to tamp it down, and the fill was brought to grade. But when surveyors went back to check the grade several days later, it was 0.4-foot low. What had happened was that the fill material had dried under the pounding given it by heavy hauling vehicles, and the vibration had caused it to sift down between the interstices of the clean lava rock particles. The grade had to be built up several times before the roadbed was made solid.

Equipment Upkeep

With the good service afforded by the equipment distributors in nearby Reno, Morrison-Knudsen was able to operate its spreads with only $15,000 worth of parts on hand in the field shop. On-the-job maintenance consisted mainly of providing equipment with lubrication and fuel during each shift, replacing spare parts, and making minor repairs. The only extensive repair work done in the field consisted of making alterations on the Manitowoc shovel. It had arrived at the site after excavating a million cubic yards of material on a previous assignment and needed a number of new parts. Drilled steel was sharpened in Reno.

Personnel

The improved highway section was built under the general supervision of the Nevada Department of Highways, which is headed by H. D. Mills, state highway engineer. J. D. Meacham was construction, maintenance, and secondary roads engineer, and Neal Austin was resident engineer. Morrison-Knudsen's field forces were under the general supervision of R. J. Jones, project manager.

THE END

Oliver Corp. Appoints

Harold T. Ames and Eugene W. Kettering have been elected to the board of directors of the Oliver Corp., construction-machinery manufacturer of Chicago, Ill.

Vibrating Screens For Asphalt Plants

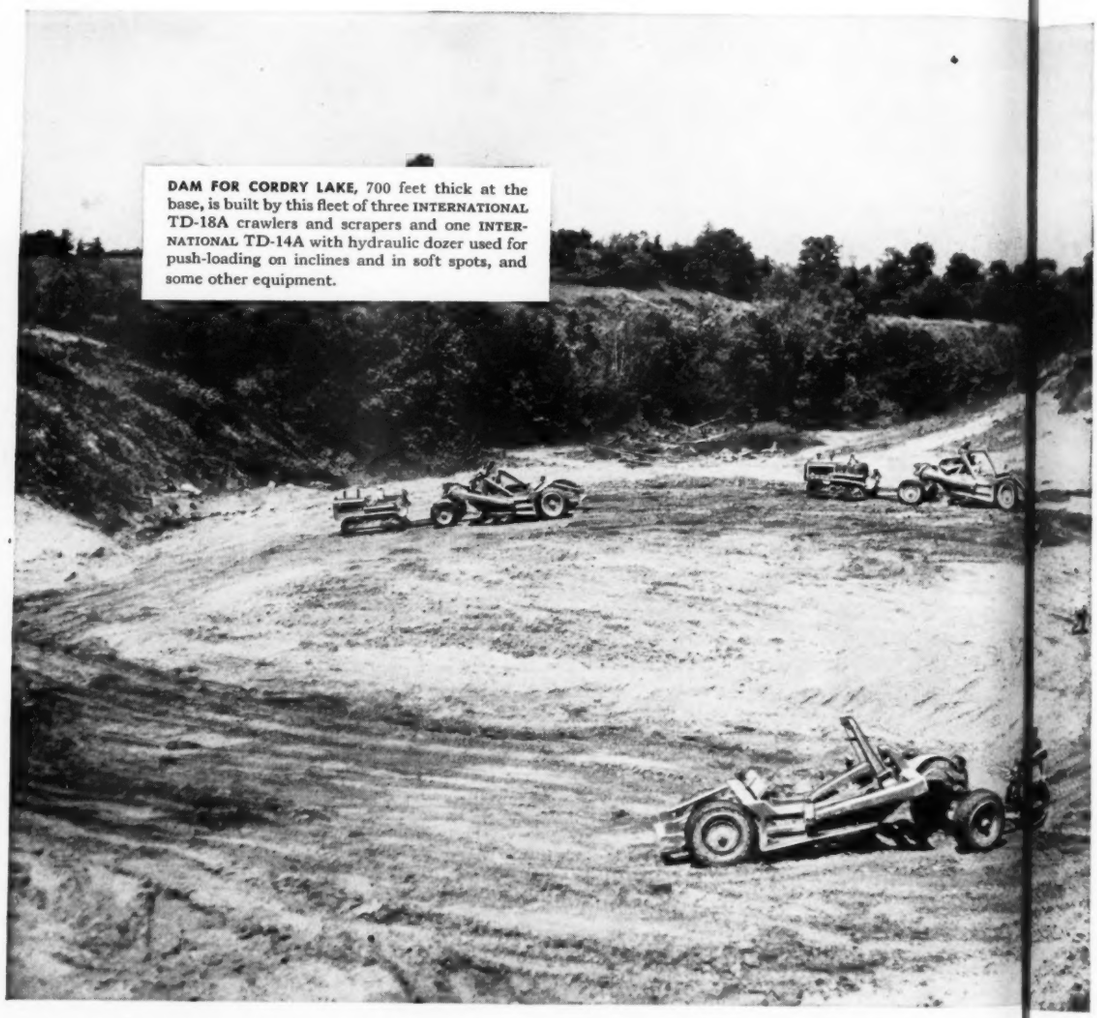
■ A bulletin on the new Deister Type UF horizontal vibrating screens, designed especially for asphalt plants, has been released. The literature points out that the Deister triple-deck flat screens obtain their efficiency through a drop-deck feature that provides greatly increased screening area for critical size aggregates. The drop-deck design permits the heavy input feed to be dumped onto the second coarsest screen, for closer separation and longer wear life of the screening medium.

To obtain Bulletin No. 56 write to Deister Machine Co., 1933 E. Wayne St., Fort Wayne 4, Ind., or use the Request Card at page 18. Circle No. 359.

Hercules Opens Branch

A southeast factory branch has been opened by the Hercules Motors Corp., Canton, Ohio, to serve the states of Florida, Alabama, Georgia, and South Carolina.

Located at 400 S. Edgewood Ave., Jacksonville, Fla., the branch maintains a complete line of Hercules gas, gasoline, and diesel engines and power units. Manager of the branch is John C. Poulton.



DAM FOR CORDRY LAKE, 700 feet thick at the base, is built by this fleet of three INTERNATIONAL TD-18A crawlers and scrapers and one INTERNATIONAL TD-14A with hydraulic dozer used for push-loading on inclines and in soft spots, and some other equipment.

LAKE LEAKAGE is eliminated by removing all porous soil and stone from the site of the dam base and replacing it with impervious clay fill from distances up to 1,000 feet from a nearby hill.

BUILDING UP THE DAM BASE moves along on schedule as one of three TD-18A scraper combinations brings a heaping load of clay to the construction site.

Equipment for Handling And Storing Cement

■ A booklet on cement handling and storage equipment has been issued by Fanning-Schuett Engineering Co., 4325 N. Third St., Philadelphia, Pa. The literature covers equipment for central-mix and transit-mix plants; cylindrical, conical and rectangular bins; portable storage bins; collecting cards; scales; batchers; and beam equipment.

Photographs and schematic drawings of the equipment show a variety of arrangements to suit practically any installation. Dimensions and capacities are given, and cutaway views show the internal working mechanism of certain pieces of equipment.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 381.

Three Improved Models Of Torque Converters

■ Three new models of torque-converter couplings are illustrated in a booklet from the Fuller Mfg. Co., Kalamazoo, Mich. Designed for use with engines developing 180 to 225 pounds-feet of torque governed at 2,000 to 2,200 rpm or higher, the couplings deliver up to 2.1 to 1 torque multiplication with automatic adjustment to 1 to 1 coupling operation as torque demand drops.

The literature provides performance and engineering data for various types of applications.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 369.

Rename Wayne Division

The name of the fourteen-year-old Wayne Crane Division of American Steel Dredge Co., Fort Wayne, Ind., has been officially changed to Wayne Shovel & Crane Division. The division manufactures crane-excavators and industrial yard cranes.

Improved Fasteners For Open-End V-Belts

■ Improvements have been announced in the Alligator V-belt fasteners used to make up open-end V-belting in various lengths to fit any drive quickly. The improvements include the substitution of a nylon bushing for the steel bushing formerly used. This reduces the weight of the fastener, helps to absorb shock, and adds the wear-resistant qualities of nylon to the fastener.

Alligator V-belt fasteners are furnished in sizes for A, B, C, and D belts.

For further information write to Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill., or use the Request Card at page 18. Circle No. 395.

New Torque Converters Act as Fluid Couplings When Load Decreases

■ A broad line of torque converters for application in heavy-duty off-the-road vehicles as well as for stationary power plants used in construction is now being produced by Clark Equipment Co.'s Automotive Division, Falahee Road, Jackson, Mich. Torcon torque converters are available in 11 to 19-inch wheels and in 26-inch wheels. Of the single-stage type, the Torcon units have rated capacities from 30 to 600 horsepower. Basic accessories include a pump, cooler, and pressure regulator.

An important optional feature offered is a "free wheel" mounting for the stator or reaction member. According to the manufacturer, this arrangement gives the unit the combined advantages of the torque converter and fluid coupling. Under load, it provides the desired torque multiplication. When the load decreases and the speed increases, the torque multiplication drops to one and the unit acts as a fluid coupling. The "free wheel" feature is recommended for equipment operating at low load and high speed for an appreciable part of the daily work cycle.

For further information write to the company, or use the Request Card at page 18. Circle No. 392.

Booklet on Drilling Tools, Compressors, and Hoists

■ Products covered in a booklet from Copco Pacific, Ltd., range from rock drills to the new Atlas all-purpose hoists. Included are details on the 13-model series of Atlas compressors, including the NT-9-MV portable unit with a diesel air-cooled motor.

Also shown are Sandvik Coromant drill steels, extensions, and detachable tungsten-carbide bits, tampers, spaders, paving breakers, and sheeting drivers. Various parts and accessories such as portable grinders, air couplings, and fittings, are also illustrated.

To obtain Booklet CP-65 write to Copco Pacific Ltd., 930 Brittan Ave., San Carlos, Calif., or use the Request Card that is bound in at page 18. Circle No. 366.

Volunteer civil defense workers in white overalls run through a rescue drill among the debris of an apartment house demolition project in The Bronx. To the left, a fireman fights a blaze atop lumber-littered foundation walls.

Heavy construction equipment forms a vital unit in New York City's front line of civil defense

Mechanized minutemen

By WILLIAM T. DARDEN, Assistant Editor

One of the largest spreads of heavy construction equipment—a total of some 50,000 units—stands ready at this very moment to go into operation on a vital project. It has been ready, in fact, for about two years. But the men charged with directing this gigantic job hope the delay will stretch out indefinitely.

Public and privately owned equipment ranging from bulldozers and other big mobile rigs down to an infinite variety of hand tools makes up this record spread. As many as 90,000 engineers, technicians, operators, and construction workers are ready to go to work on short notice. Nearly four years have been spent lining up these machines and crews, and in drawing up a complete work plan. Still, it has been a labor of duty, not of love.

This inventory of equipment, manpower, and work patterns represents one of the major efforts of the Public Works Emergency Division of New York City's Office of Civil Defense. The PWED, engineering arm of the city's elaborate defense setup, has the important—if somewhat grim—job of being ready to clear debris from streets and roads, do heavy rescue work, demolish unsafe buildings, and handle other bigger-than-man-size jobs in the event of an atom or hydrogen bomb burst over New York.

Like other civil-defense efforts, PWED represents an expenditure of manpower, money, and time simply for preparedness. Its job is to be ready to go into action immediately following an event which more than half the world is striving to prevent. Despite this paradox, PWED is organizing a powerful potential force for meeting the emergency conditions which a nuclear attack would create.

Framework of PWED

Obviously, all this equipment and manpower is not just standing idle. It is a basic principle of civil defense to utilize existing organizations and facilities—to coordinate the available resources of an area. All the way down the line, New York City departments, bureaus, industries, and volunteer groups have been mobilized into an intricate stand-by organization for use in case of an attack on the city.

PWED, headed by Frederick H. Zurmuhlen, commissioner of public works, is the emergency engineering organization of the city's civil defense forces. It coordinates the potential emergency functions of 16 city departments, 10 utility companies, and some 800 large construction firms in the city's five boroughs. By act of the New York State Legislature, it has power to order men and machines into action after an enemy attack.

The day-by-day task of supervising the work of this engineering arm is the responsibility of Byron T. Conrad, P.E., whose title is coordinator of the Public Works Emergency Division. He has had a key role during the last four years in building an organization which would be available for restoration work immediately after nuclear attack. A New York City engineer for more than 20 years, he knows well the operations of the city's numerous departments and boroughs. The inventory of heavy equipment available in New York City's five boroughs was

City engineers check a pelorus, one of a chain installed around the periphery of New York City. The location of a bomb burst can be determined by sighting through such instruments.

In his Municipal Building office in downtown Manhattan, PWED Coordinator Byron Conrad directs the compilation of a huge inventory of heavy construction equipment for use in case of nuclear attack. A civil defense map of the city is at right.

compiled over a two-year period by a staff of 25 persons in the PWED's central headquarters. Equipment inventory sheets were mailed to more than 1,000 construction firms in the city. Approximately 75 per cent of these answered, listing 14 general types of equipment together with the number and work capacity of each.

Equipment listed on the sheet included trucks and automobiles, trailers, truck cranes, crawler cranes and shovels, power hoists, other types of hoisting equipment, jacks, bulldozers and other grading equipment, air compressors, air tools, all types of loaders and conveyor machinery, electric generators, electric tools, welding equipment, pumps and pumpers, shoring and bracing material, marine equipment, hand tools, and miscellaneous construction materials.

The information received on these inventory sheets was compiled and tabulated in the PWED office, and then punched on accounting cards by an IBM service bureau under a city contract. These cards may be sorted mechanically according to codes signifying types of equipment and the areas where it is available. Each contractor's equipment was listed on a separate ledger sheet, and these were bound according to a code system in a 3½-inch-thick loose-leaf book measuring 8½×11 inches. Copies of this complete listing are in the offices of PWED borough chiefs and other key personnel.

Available equipment in a particular area may be determined within a few seconds by first consulting a master file and then referring to the complete listing.

In addition to the types, number, and capacity of machines and equipment, each contractor's sheet fully identifies the firm, its owner, location, and the individual responsible for dispatching equipment. Night and day telephone numbers are an important item. Much of a contractor's equipment is likely to be out on a job; consequently it is the dispatcher—the man who knows where every piece of equipment is—that the PWED will contact in an emergency.

The inventory is kept reasonably up-to-date by an annual telephone check. PWED office personnel call each contractor once a year, asking him what new equipment he has on hand, what equipment he no longer has available, and any other pertinent questions.

(*Continued on next page*)

This peacetime demolition project in the borough of The Bronx gave officials of New York City's Public Works Emergency Division an opportunity to run a debris-clearing test. The Caterpillar D8 tractor with dozer blade cleared a 200-foot road for fire trucks in 13 minutes.

(Continued from preceding page)

Encouraging as the results have been, Coordinator Conrad knows that many contractors in the city are not listed in the PWED inventory. Consequently, he is continually urging construction firms not yet listed to enroll their equipment and key personnel in PWED's mechanized reserve corps. He is quick to point out that this enrollment involves no obligation other than that of being ready and willing to lend a hand in the event of a nuclear attack.

Mutual-Aid Pacts

New York City has possibly the largest inventory of construction equipment in the world, but even this huge potential spread would not be sufficient for emergency needs in the event of a major attack on the city. Consequently, working agreements with neighboring communities have been incorporated into the PWED plan of operation. Seven New York counties to the north are ready to send large quantities of heavy equipment down into the city without further notice if an attack comes.

For example, if an atom or hydrogen bomb fell in the lower part of The Bronx, where the greater share of that borough's equipment is located, the upper Bronx would be cut off from the rest of the city. The seven upstate counties would then come to the aid of the stricken borough by sending heavy equipment down the policed highways and roads leading into the northern part of the city.

A similar arrangement has been made with Nassau County to the east of the city. In all these cases the mutual-aid arrangement is reciprocal, of course.

In the PWED plan of operation, the city has been broken down into areas for administrative convenience in time of emergency. The major division is represented by the five boroughs of Manhattan, The Bronx, Queens, Brooklyn, and Richmond (Staten Island). In each of these boroughs there are defense districts, which correspond roughly to police divisions. Districts are in turn broken down into areas which approximate police precincts. The disaster area within any one precinct will comprise a segment, and this last category will be the basic working area in an emergency.

At various points around the city the PWED has spotting stations for determining the exact location of a burst over the city. Set up at each of these stations is a pelorus, a navigational sighting instrument, manned by engineers in the city's employ. With this instrument, engineers can take an azimuth reading on the "mushroom" of smoke created by an atom or hydrogen bomb.

If an attack comes, the PWED will go into immediate operation along these lines:

Engineers who can sight the direction of the burst from their spotting stations will telephone the information to the city-wide control center where the burst will be triangulated, and its location determined. This information will then be relayed to all boroughs by direct telephone line.

Each borough has its PWED chief of operations, and it is from his office rather than from the city-wide headquarters that restoration in his borough will be directed.

Normal operation of the city's many departments and facilities requires the services of hundreds of engineers in each borough, and an important role in PWED's emergency work has been assigned to these men. When an attack comes, these engineers will go

Byron T. Conrad, coordinator of New York City's Public Works Emergency Division, uses one of the PWED's 41 two-way mobile radio units during a test. Borough chiefs' and key engineers' cars are equipped with the units.

Thirty miles of 8-inch steel pipe like that shown in the picture were purchased by the federal government and stockpiled in New York for emergency use. Here volunteer and regular firemen connect the pipe to a pump during a PWED drill.

directly to the disaster areas and then report to their district offices, where personnel will in turn relay summarized information to the borough chief. In this way, the exact location, extent, and type of damage in a given district will be determined by the time equipment and men arrive for action.

Knowing to some extent what the conditions are in his territory, a borough chief can assign mutual-aid equipment which is arriving from outside the city. This equipment has been instructed to report to aid check points, of which there are 14 around the city. Mobilization or staging areas are also located throughout the city, and here the equipment will be assembled and dispatched as needs become known.

City engineers within a particular segment or disaster area will assume "field command," directing restoration work in cooperation with policemen, firemen, and other civil defense workers.

Breakdown of Mission

Specific tasks which the PWED will undertake in such an emergency include:

Opening traffic lanes, in order to permit passage of vehicles engaged in civil defense operations;

Controlling electric, gas, steam, and water distribution;

Shutting off damaged gas, water, and steam mains, as well as cutting off damaged or exposed electric cables;

Doing heavy rescue work involving clearing, shoring, bracing, tunneling, and the like;

Shoring hazardous structures to permit their emergency use;

Demolishing unsafe structures;

Restoring gas, electric, steam, and water supplies and transportation facilities for emergency use;

(*Continued on next page*)

This 55-kw diesel generator is one of ten purchased by the City of New York and placed at strategic spots in the five boroughs for emergency use in the event of power failure from an attack. The unit will furnish power for the essential functions of a hospital.

(Continued from preceding page)

Decontaminating streets, structures, mobile equipment, and water supply;

Determining the serviceability of damaged structures;

Supplying auxiliary emergency power and lighting;

Installing temporary window closures;

Performing other engineering functions, as required.

As part of its preparation for emergency operation, the PWED has stockpiled certain equipment around the city. Ten 55-kw mobile generators, each capable of providing emergency power for the essential functions of a hospital, have been purchased and placed at strategic points. The federal government has helped in this regard, too: 30 miles of 8-inch pipe and twelve 1,500-gpm pumps have been stockpiled in or near the city for emergency use in event of a disaster. The federal government also has placed 14 smaller generators and a large quantity of flexible vinyl plastic for temporary window closures at the disposal of the PWED organization.

Communications

Two-way radio will play a big part in the PWED's operations during an emergency. The Public Works Emergency Division has the use of two wave lengths, one of which is used exclusively by the water department for communication all along the upstate watershed. The other is available for directing restoration operations within the city.

Forty-one mobile radio units are at present operated by the PWED. They are located in emergency trucks, and borough chiefs' and engineers' cars. A 250-watt base station is located in each of the five boroughs. In time of emergency, information will be relayed from the field of disaster to control headquarters, and vice versa, through this radio hookup.

Battery-powered electronic megaphones will be used by field engineers in directing operations at the scene of a burst.

As highly organized as is the PWED, there are certain links missing in the chain which makes up the organization. One of these is the lack of specific information, based on field tests, about capacities and the amount of time it takes to clear a street or other area. Some tests have been run, but only an actual bombing would create adequate test conditions. And there are no funds available for a test simulating emergency condi-

tions. Present capacity ratings are based on a key unit of a bulldozer load per hour. It is estimated that an average bulldozer can clear a 10-foot lane through 600 feet of foot-deep debris in an hour.

There are many things that have to be taken into account in figuring the working capacities of these machines. A mathematical formula for efficient operation in an emergency involves the element of time—especially important where injured persons are concerned. For example, a person subject to severe shock will require treatment within six hours if his life is to be saved or serious complications are to be avoided. These elements of time, amount of debris, and number of vehicles are all pertinent to the planning of an efficient operation.

Recently, a manufacturer of construction equipment agreed to put some of its engineers to work determining workable capacities for heavy machinery in clearing debris. PWED officials hope the results of this research will give them a more exact formula for rescue work.

Marine Setup

Independent of PWED, Byron Conrad also heads an emergency marine organization for the port of New York. On this project he works closely with the U. S. Army Corps of Engineers, the city's Department of Marine and Aviation, and the marine industry. This harbor committee has a reciprocal aid pact with portions of New Jersey and Connecticut, so that marine salvage and fire-fighting equipment would be sent here in the event the harbor was bombed.

Civil defense has become almost a science in the years since nuclear energy was released. In the office of the PWED, government publications and files of statistical matter give detailed information on the amount and type of damage to be expected in various areas from bombs of various size. Working with these figures, New York City's Public Works Emergency Division has mapped a program of operations which is eliminating virtually all unknown factors. It is building an organization of preparedness which will be able to cope with the most disastrous emergency.

The chief nations of the world are meeting day after day at the United Nations headquarters in New York City trying to eliminate the chance of such a disaster.

PWED officials are as hopeful as anyone else that the U. N. will succeed, and that nuclear attack will someday no longer be a threat. But a realistic view and a sense of obligation to the people of their city keeps them at their job. They are seeing to it that New York is prepared to survive. THE END

Ephemeris Available to Surveyors and Engineers

■ The 1955 pocket-size edition of the Gurley Ephemeris, including a chart of Polaris which makes possible an observation of the star within a minute, is now available from W. & L. E. Gurley, Troy, N. Y. The edition again includes an almanac, listing 28 selected stars for determining stellar observations. A feature included for the first time is the Greenwich Hour Angle of Polaris for each day.

The almanac is an abridgement of the American Nautical Almanac. It gives complete instructions for determining azimuths by methods similar to those used in observations of the sun and Polaris.

To obtain the Gurley Ephemeris write to the company, or use the Request Card at page 18. Circle No. 368.

THE 1,250-GALLON Cartwright Precision distributor is shown with a 12-foot Straight Line hot spraybar. This is the new full-circulating no-drip Cartwright spraybar, which features balanced pressure. Note that the side-mounted engine, ahead of the right rear wheels, is in a cool and accessible location. This mounting allows the tank to be close to the cab and eliminates excessive overhung weight at the rear. For details write to Cartwright Industries, P. O. Box 3251, South Highland Station, Birmingham, Ala., or circle 398 on card at page 18.

The steel template, cantilevered beyond one end of the barge, is positioned over the site of a bent as a Bucyrus-Erie 38-B crane prepares to lower a concrete pile for driving. *C&E Staff Photo*

New low-level trestle replaces timber span

One of 1954's largest bridge projects in North Carolina is the 1,763-foot low-level span across the Trent River at New Bern. This city, located at the confluence of the Neuse and Trent Rivers, is about 35 miles from the coast. Before the new span was completed, travelers heading southeast to the coast had to maneuver through New Bern's downtown traffic, then cross an obsolete timber bridge. The new bridge bypasses all the local traffic and carries motorists swiftly across the Trent River.

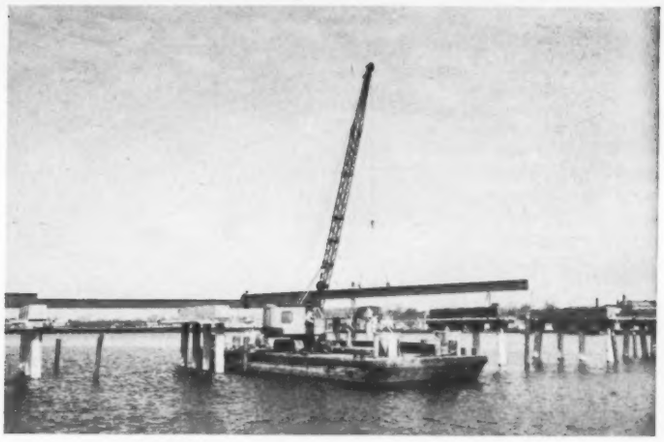
The structure was designed by the bridge department of the North Carolina State Highway and Public Works Commission, which has T. B. Gunter as chief bridge engineer. The $850,000 contract for the span was awarded to McMeekin Construction Co., Cheraw, S. C., sometime in the fall of 1953.

With the exception of a steel truss swing span at the channel, the bridge consists of a concrete deck on continuous steel beams supported by concrete pile bents 35 feet apart. The bents contain four 20-inch octagonal piles—two plumb and two battered 1½ inches per foot. Five tower bents are also provided, with 6 piles per bent. Four of these piles are battered 1½ inches per foot longitudinally, a pair battered in each direction. The two outside piles are battered 1½ inches per foot transversely—the same as the four pile bents. These bents, provided for increased longitudinal stability, are in addition to the bents at the ends of the swing span and the two adjacent bents located near the barrier gates. The latter bents also have piles with longitudinal as well as lateral batter.

Piles 25 to 60 feet long were driven to firm material and capped with poured-in-place concrete. Caps measure 3 × 2½ feet, and are 31 feet long. Five steel beams per span were placed over the caps and tied together with welded diaphragms. The 6½-inch-thick concrete deck was poured on top, providing a 28-foot roadway and two 3-foot sidewalks.

At the channel, a steel truss swing

Barge-mounted template aids driving of concrete piles for 1,763-foot pile-bent bridge for vehicular traffic



A barge-mounted Northwest crane sets a steel stringer between pile caps. Deck concrete for the $850,000 bridge was placed in plywood forms suspended from the steel beams.

C&E Staff Photo

span provides 78 feet of clearance on both sides when open. The heavy pivot pier is supported on about 40 piles.

Pile Driving

McMeekin set up a yard near the river's edge to cast the concrete piles. Using standard wood forms, he poured about 16 piles a week. Concrete was batched and mixed on the site. Forms were stripped after 24 hours and the concrete given a water cure for ten days. After 21 days, the units were loaded onto a barge and towed to the bridge site.

To speed the driving, the contractor built a steel template and cantilevered it beyond one end of a barge. The template was placed exactly over a pile position by maneuvering the barge. The Bucyrus-Erie 38-B crane that was mounted on the barge set the piles in the template with ease, and then drove them to 45-ton bearing. The No. 0 Vulcan hammer was supplied with steam from a 60-hp boiler, which was also set up on the barge. About four piles were driven every day.

Concrete cap forms consisted of 1¼-inch decking and sides on 2×6 joists and 3×10 stringers. The entire unit was supported on 3×10 friction collars. Caps were poured three times a week.

After the steel beams were erected by a barge-mounted Northwest crane, plywood forms were suspended from them for the deck pour. Two Jaeger 2-yard truck mixers hauled the concrete as far as possible, and it was buggied to the pour. About 100 linear feet of deck was placed per week. Forms were stripped in 7 to 14 days, depending on the weather.

Personnel

H. S. Creech was superintendent for McMeekin Construction Co. J. B. Cutchin was resident engineer for the North Carolina State Highway and Public Works Commission, which is headed by W. H. Rogers, Jr., state highway engineer.

THE END

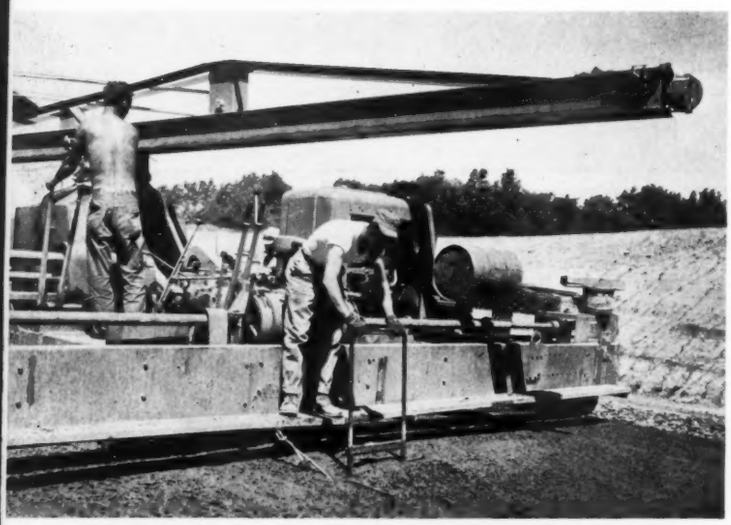
While a Buckeye Finegrader brings the base to exact grade between the forms, an International batch truck hauling to the paving spread crosses the Finegrader on a special bridge. The trucks carry two 37.4-cubic-foot batches.

C&E Staff Photos

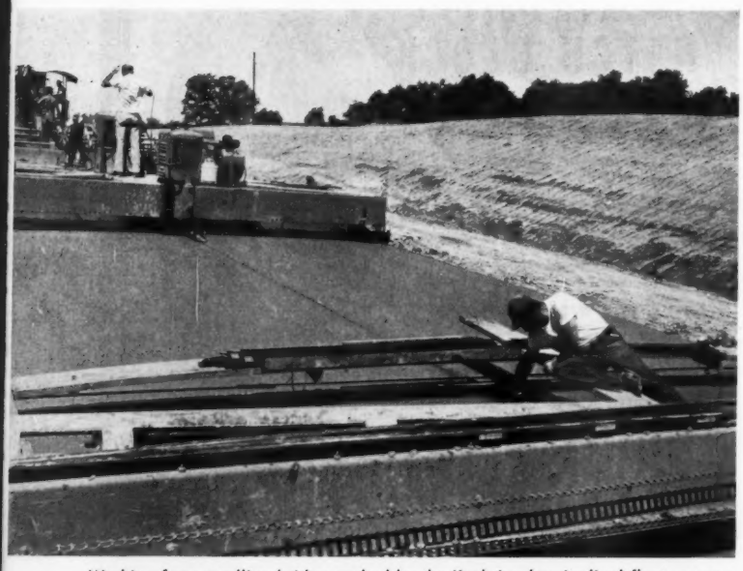
Carlson's paving train for this stretch of all r… concrete is led by a Koehring Twinbatch 3… paver pulling a Cleveland planer. Follow…

Concrete resurfacing imp…

By RALPH MONSON, Field Editor



A workman at the rear of the Jaeger spreader sinks a center tie bar into the concrete with a shop-made tool. The ties are ½-inch-diameter round bars 30 inches long, and are placed at 3-foot centers.



Working from a rolling bridge pushed by the Koehring longitudinal float, a member of Carlson's crew inserts asphaltic center-joint strips in the cuts made by the joint cutter at the rear of the Jaeger finisher ahead.

Laying a new concrete pavement directly over the old one was the unusual procedure followed in remodeling portions of U. S. 30 east of Tama, Iowa. Where vertical curves in the old road were short and sight distances too restricted, the old pavement was removed, the roadway regraded, and a completely new pavement laid on the new grade. Where the old sight distances were satisfactory, however, a new pavement 6 inches thick was laid over the old monolithic slab with 2 feet of 10-inch widening slab on each side.

The surface of this entire stretch of highway is finished as a uniform pavement, so that it is impossible to distinguish portions of new pavement from those which have been widened and resurfaced.

In the 8.2 miles of this project there is a total of 54,817 square yards of new pavement 24 feet wide, 10 inches thick at the edges, and tapering to 9½ inches 3 feet in from the edges. In addition, 12,298 cubic yards of concrete was placed in resurfacing old pavement. The new surface is a minimum of 6 inches thick and represents approximately 70,000 square yards of pavement.

Contractor for the project was Fred Carlson Co., Inc., Decorah, Iowa. The job was just one of a number of grading, paving, and resurfacing projects undertaken last summer in a program to modernize U. S. 30—the transcontinental Lincoln Highway and the major east-west highway through central Iowa.

Where the old pavement was to be resurfaced, lip curbs were knocked off with a special machine developed by Iowa Highway Commission technicians for this purpose. Areas which were badly cracked or had failed were patched with new concrete. Shoulders were then excavated deep enough to accommodate a full 10-inch-thick slab alongside the old pavement. The base of this 2-foot widening strip on each side of the old 20-foot slab was thoroughly rolled with a Buffalo-Springfield trench roller.

From this point on, there was little difference between placing the completely new pavement and resurfacing and widening the old—except for the amount of concrete used.

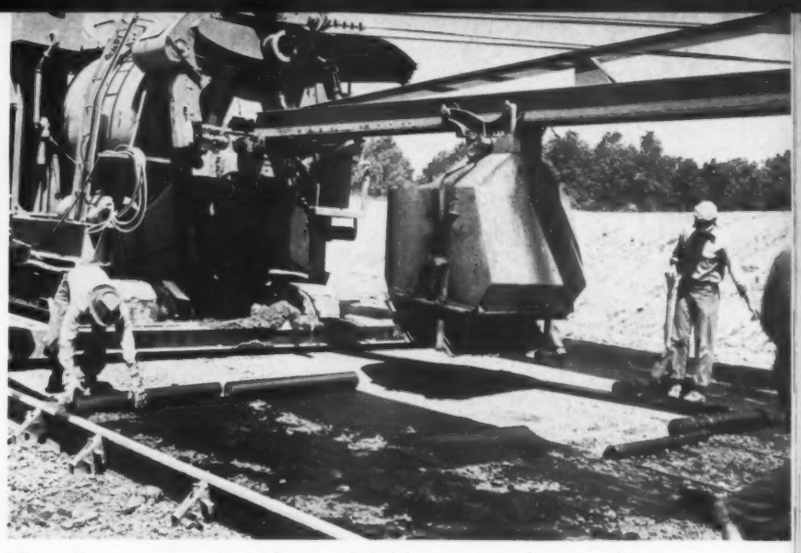
Where the old pavement was removed and the roadbed regraded, a subgrade of glacial clay was placed and compacted—first by sheepsfoot tampers and then by a Buffalo-Springfield 5-ton three-wheel roller. In those areas where the pavement was completely new, an Adams 550 motor grader and a Buckeye FG-24 Power Finegrader teamed up to bring the base to exact grade after the forms were placed. Batch trucks hauling to the paver operated inside the forms and crossed the Finegrader on a bridge.

Conventional Paving Setup

The remainder of the job was substantially a conventional paving operation. Blaw-Knox 10-inch steel forms were set on the compacted subgrade after a Cleveland Formgrader had cut the base to grade. Workmen drove form stakes with Thor pneumatic hammers supplied with air by a Gardner-Denver air compressor. Two Cleveland form tampers compacted the grade under the forms.

Concrete was dry batched from a plant set up on the roadway near the middle of the job. Crushed rock coarse aggregate was supplied by Ferguson Concrete Materials & Construction Co., Ferguson, Iowa. The aggregate was shipped by rail to Gladstone, Iowa, transferred by trucks to a belt conveyor system, and trucked 6½ miles to the plant. Cement from the Dewey Portland Cement Co.'s plant at Davenport,

Closely behind are a Jaeger spreader, a Jaeger finisher, a Koehring longitudinal float, and a shop-made belting machine.



Where all new pavement is put down, asphalt felt paper is used to cover the subgrade. After the paper is rolled out, small amounts of concrete are used to weigh down the sheets until the slab is laid.

ing improves old pavement

Narrow highway is widened and topped with 6-inch wearing slab in some sections, regraded and newly paved in others

Iowa, was unloaded into a Johnson storage bin at Tama, then trucked to the job in covered dump trucks. Sand was produced by the Flint Crushed Gravel Co., Tama, and trucked 12 miles to the batch plant.

Stockpiles were maintained and the aggregate bins charged by a Koehring 605 crane using a Blaw-Knox 2-yard clamshell bucket. The Johnson 80-ton two-compartment bin was equipped with a single weigh-batch hopper. Cement was weighed out in a Johnson plant with a 280-barrel storage silo and twin weigh-batch hoppers. Batch trucks carried two 37.4-cubic-foot batches. On this job Carlson used a maximum of 24 batch trucks, of which eight were L-160 Internationals owned by the company. Batch trucks were equipped with shop-made separate cement compartments to prevent loss of cement during transit.

Paper Over Subgrade

On the grade, the Koehring 34-E Twinbatch paver operated inside the forms, depositing the concrete ahead of a Jaeger spreader. As the paver moved along, workmen unrolled asphalt felt subgrade paper to cover the subgrade between the forms. Sheets of this paper were lapped to insure complete coverage. Small amounts of concrete were scattered over the paper by hand to hold it in place until the subgrade was completely covered.

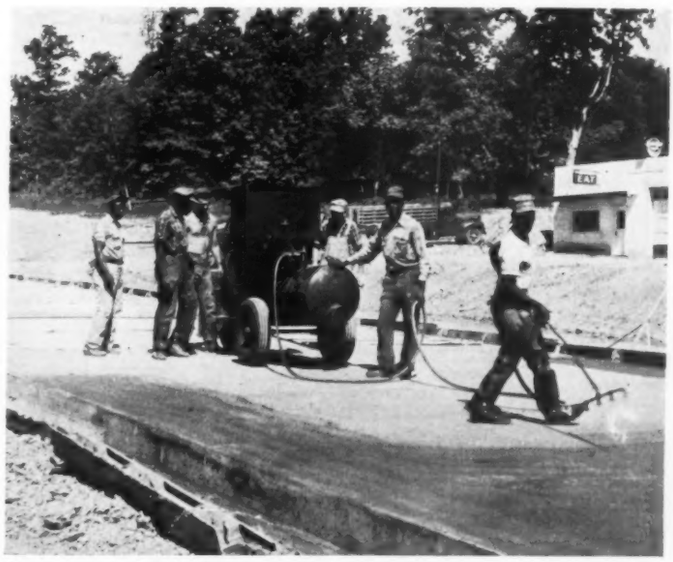
A workman standing on a platform on the rear of the spreader dropped a ½ × 30-inch center tie bar every 36 inches. These bars were sunk to a depth of 5 inches in the concrete with the aid of a shop-made tool. The bars provided the only reinforcing in the pavement.

A Jaeger finishing machine with a front-mounted Jackson vibratory tube powered by a Jackson generator followed the spreader. On the rear of the finisher a longitudinal joint cutter made a center cut 3½ inches deep. Asphaltic center-joint strips were inserted into this cut by a workman on a rolling bridge which was pushed along by the Koehring longitudinal float. These center-joint strips were clipped together with aluminum clips and sunk down below the surface of the slab so they would not obstruct the longitudinal float. Expansion joints were inserted only at bridges—one on each side, 300 to 500 feet from the bridge.

Bringing up the rear of the paving train was a shop-made belting ma-

(Continued on next page)

By means of a 26-foot offset spraybar, this Ford sprinkler truck applies a light spray of water over the entire 24-foot-wide pavement. Wet burlap is put down on the new pavement for the first 20 hours.



With concrete forms and burlap removed, the surface of the slab is sprayed with a coating of Kapco concrete-curing compound. A Littleford Bros. tank sprayer pumps the compound to a spraybar equipped with five nozzles.

A Clipper ConSawMatic concrete saw with abrasive blade cuts transverse joints in the new pavement.

At this batch-plant setup midway in the project, a Koehring 605 crane with Blaw-Knox 2-yard clamshell bucket loads Johnson two-compartment bins from which aggregates are in turn weighed out to batch trucks. The Johnson cement plant at left has twin weigh-batch hoppers.

C&E Staff Photo

(Continued from preceding page)

chine which duplicated the usual hand belting procedure. It was operated easily by one workman. Hand floating and finishing along the forms completed the paving operation. The fresh concrete was covered with burlap as soon as possible after the finishing.

Specifications required curing with wet burlap for an initial period of 20 hours. Carlson kept the burlap wet with an ingenious spraybar attached to one of the water trucks. The bar was 26 feet long and extended out to one side of the truck, so that the truck could travel along the shoulder and spray the entire width of the pavement at once.

After the forms were removed, the burlap was picked up and the surface of the pavement coated with Kapco concrete-curing compound. The compound was applied with a hand-held spray with five nozzles, the material being supplied through a hose from a Littleford Bros. tank sprayer.

First Joints Sawed in Iowa

Transverse joints were sawed here for the first time on an Iowa Highway Commission paving contract. Specifications required that every fourth joint be sawed within 24 hours after placing, and the balance within 10 days. Actually the contractor found he could easily saw all the joints in the initial 24-hour period. Two Clipper ConSawMatics using 12-inch abrasive blades cut the transverse joints to a depth of 1½ inches at a rate of less than five minutes per joint. Of this, 45 seconds to a minute was used turning the saw around and getting started.

These saws were self-propelled and were equipped with electric self-starters. One had a belt-driven pump to pump water from its supply truck to the saw tank. The other depended on gravity or the pump on the supply truck to fill its tank. Water supply to the saws was provided by two trucks carrying 1,000-gallon supply tanks.

Maintenance of the equipment in the field was handled by one mechanic with a well-equipped service truck. The F6 Ford truck carried a P&H 400-amp electric welder, an oxyacetylene welding and cutting outfit, a vise mounted for convenient use, and a complete assortment of small tools in built-in tool boxes. This rig could get right to any machine needing repair with all the tools and equipment necessary for the job.

Superintendent of the job for Fred

The Biggest Earthmoving News in Years!

The INTERNATIONAL DROTT 4-in-1

Turn the page for the complete story on this newcomer to the long line of INTERNATIONAL earthmoving products.

PRESENTING THE

New INTERNATIONAL DROTT 4-in-1 Skid Shovel

- **New Versatility**
- **New Ease of Operation**
- **New Hydraulic Shovel Selector instantly converts the 4-in-1 into a Bullclam, Clamshell, Skid-Shovel, or Bulldozer**

Here's the unit that answers every requirement of contractors and smaller communities for one piece of machinery capable of handling a multiplicity of earthmoving jobs.

It's the NEW 4-in-1 multi-purpose addition to the famed INTERNATIONAL DROTT Skid-Shovel line, and it's available on INTERNATIONAL TD-6 and TD-9 crawlers.

The 4-in-1 can be immediately changed into a Bullclam, a Skid-Shovel, a Clamshell, or Bulldozer by merely shifting the "shovel-selector" lever into the desired position. The lever is located within easy reach of the operator and shovel selection can be made either when the tractor is in motion or standing still.

Like all products in the INTERNATIONAL DROTT line, the new 4-in-1 Skid-Shovel takes wear and strain from the tractor by transporting heaped loads at ground level on the exclusive Skid-Shoes. And these same Skid-Shoes permit use of the lever principle to supply 300% greater breakout force than on competing front-end loaders. There is the Hydro-Spring feature, too, found only on INTERNATIONAL DROTT equipment that absorbs 70% of shock normally encountered in front-end loaders.

For excavating or loading, the standard INTERNATIONAL DROTT Skid-Shovel is tops. But if you're looking for one machine to handle many different types of jobs, the 4-in-1 is it.

2 **CLAMSHELL**—Opening the clam lip wide makes it possible to operate it as a clamshell for loading from stockpiles or picking up loose material in close quarters. Clam is closed by hydraulic pressure.

3 **BULLDOZER**—The clam is wide open and the rear of the bucket becomes the dozer. Depth of cut is regulated by forward and backward pitch of blade over loader shoes, rather than by lifting and lowering of push beams.

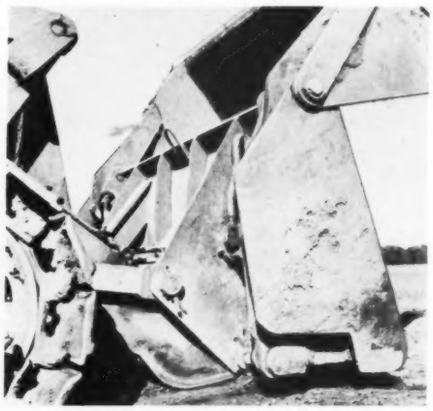
4

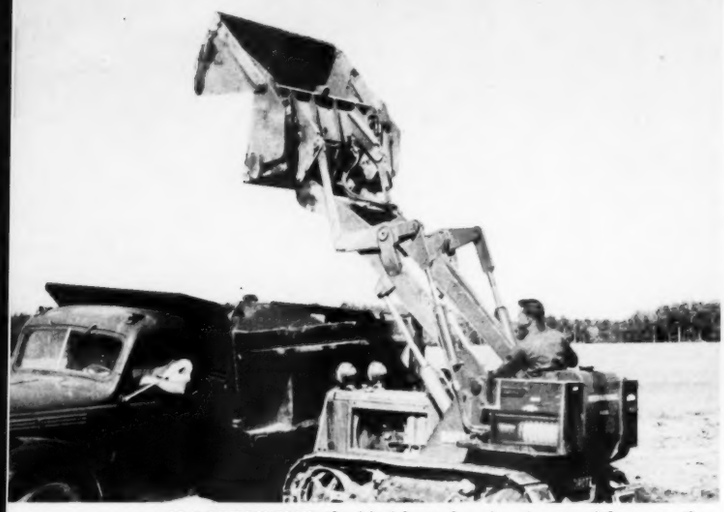
FOR MORE ON THIS REVOLUTIONARY NEW ALL-PURPOSE DIGGING AND LOADING TOOL, SEE NEXT PAGE

1 **SKID-SHOVEL**—With the clam fully closed, straight-forward loading of shovel is accomplished by rolling the entire bucket forward to excavate until filled, then rolling it back when heaped to retain the load.

4 **BULLCLAM**—When loading, the clam acts as a depth gauge. The degree of clam opening regulates the depth of cut. As the unit moves ahead, material boils into the bucket with a scraper-like action to a heaped load.

SKID-SHOES permit ground level transportation of heaped loads at high speeds. They also serve as the fulcrum of the lever principle which multiples the digging and break-out force by 300%.





AS A BOTTOM DUMP, the 4-in-1 has a dumping clearance 3 feet more than the closest competitor and permits the 4-in-1 to load material over the highest sideboards of the biggest trucks.

A New High in Front End Loaders

Dumping Height of INTERNATIONAL DROTT 4-in-1 Tops Competitors by Over 3 Feet

For loading out the biggest trucks, both off-highway and over-the-road haulers, nothing can match the "reach" and the maneuverability of the INTERNATIONAL DROTT 4-in-1.

Although the standard Skid-Shovel with regular bucket has a dumping clearance higher than any other loader in the same capacity range, *with the bottom dump feature of the 4-in-1* an additional two feet of height is obtained. Positive ejection of sticky material is assured.

For a demonstration of the outstanding multiple utility of the 4-in-1 call your INTERNATIONAL Industrial Power Distributor today. See this "one machine fleet" in action. See how most of your earthmoving or loading problems can be solved fast, efficiently and economically by this newcomer to the INTERNATIONAL DROTT line.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.
DROTT MANUFACTURING CORP., MILWAUKEE 8, WIS.

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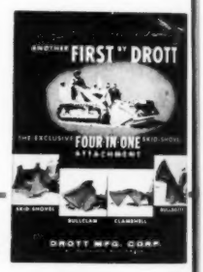
AS A FORWARD DUMP, the bucket of the 4-in-1 can also be discharged in the regular forward dump manner, which still affords a higher clearance than other loaders in the same capacity range.

FOR SOD STRIPPING AND STOCKPILING, important to landscaping contractors, golf course architects and superintendents, park and recreation officials, the 4-in-1 is placed in bullclam position to cut 2 inches deep. As tractor moves forward a blanket of sod rolls up into the bucket.

FREE

The New 4-in-1 Catalog

For your free copy of the 4-in-1 Skid-Shovel catalog fill out the coupon and mail it today.



Drott Manufacturing Corp.
3841 W. Wisconsin Avenue
Milwaukee 8, Wisconsin

Gentlemen:

Please send a copy of the 4-in-1 Skid-Shovel Catalog to

NAME_____

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Russell Chism, superintendent for Fred Carlson Co., Inc., stands beside his Ford pickup truck. Johnson aggregate bins are being loaded in the background.
C&E Staff Photo

Carlson Co., Inc., was Russell Chism. He was assisted by Paul Klink, Harry Gillham, Ole Kvam, Dale Brown, and Joe Zeien, foremen in charge of concrete, curing, plant, grade, and trucks, respectively. Resident engineer for the Iowa State Highway Commission was J. B. Durham. Gene Carey was inspector. C. L. Gleason is construction engineer for the department, and John G. Butter is chief engineer.

THE END

Leschen Offices Move

Both the warehouses and sales offices of the Seattle, Wash., and Los Angeles, Calif., branches of the Leschen Wire Rope Division of H. K. Porter Co., Inc., St. Louis, Mo., have moved to new quarters.

The Los Angeles office is now located at 6424 E. Fleet St., and the Seattle branch is now at 2724 First Avenue South.

D. G. Berglund is district manager of the Los Angeles office, and H. L. Waltman heads the Seattle branch.

Booklet Weighs Factors In Successful Bidding

■ Attempting to answer the question "What is a successful bid?" is a new Caterpillar booklet containing information intended to help the contractor determine the proper bidding price for a construction job. The booklet includes a discussion of how total costs can be figured by keeping accurate records of fuel, labor, parts, depreciation, and yardage costs.

The newcomer to the construction field should find this booklet a help in submitting a better bid, while the more experienced owner can use it to review his cost figures. The booklet also indicates earthmoving machinery which might be used for efficient operation.

To obtain Form No. DE502 write to the Caterpillar Tractor Co., Peoria 8, Ill., or use the Request Card at page 18. Circle No. 371.

Reprint of Paper On Hardfacing Deposits

■ The importance of deposit analysis and cooling rate in determining the structure of a hardfacing weld deposit is explained in a reprint of a paper presented before the American Welding Society. The paper was presented by A. Zvanut and V. Peters, development engineers for the Lincoln Electric Co., Cleveland 7, Ohio.

Test data included in the reprint indicates areas in which procedure should be controlled in order to create desired performance in a hardfacing deposit.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 372.

The "Snow Bug" is given a test run on a steep snow-covered slope by A. E. Zion, Montana communications engineer. Tools and service equipment are carried in the front pontoon-type steering section of the vehicle.

Improved vehicle operate

An efficient new type of snow vehicle which climbs mountains in heavy snows to service radio transmitting stations has been pressed into service by the Montana State Highway Commission. Called the "Snow Bug", the powerful 1,100-pound machine stays on top of light powdery snow and climbs 50-degree grades, moving easily over terrain conventional snow vehicles have been unable to reach.

The machine is an improved version of a pilot model developed by Montana State College at Bozeman. It was designed for snow survey work for U. S. Forest Service and Soil Conservation Engineers. The vehicle first came to the attention of Montana's radio engineers when the highway department unsuccessfully attempted to run conventional equipment to the top of Sweet Grass Mountain in the northern part of the state. The pilot model of the "Snow Bug" crawled up the mountain without difficulty.

Since that time, the machine has been improved in the Helena shop of the Montana State Highway Commission, and certain failings in the rig have been corrected. The chain drive has been redesigned, the frame made sturdier, and the tracking mechanism improved.

The performance of the new "Snow Bug" now has captured the interest of the Wyoming and Idaho highway departments, which also are concerned with the problem of reaching out-of-the-way radio transmitters and repeater stations during the winter. The Colorado Highway Department, faced with the same problem, is now constructing seven miles of road so that a conventional Sno-Cat will be able to reach transmitters at Rabbit Ears Pass.

The improved vehicle is essentially a low and flat toboggan with a pontoon-type base. It is driven by a chain belt attached to grousers which bite deep into the snow. Steering is accomplished by an A-frame and a truck worm gear attached to a front pontoon. The pontoon is equipped with vertical retractable steel fins which can be varied in depth, de-

n snow and steep slopes

Versatile "Snow Bug" penetrates snowbound areas to service radio stations for highway department

Loaded into a trailer, the 1,100-pound "Snow Bug" can be quickly transported to the site where it is needed. The machine is driven by a chain belt attached to grousers which bite into the snow.

pending upon snow characteristics. This front unit also serves for storage of tools and equipment needed by the radio repeater stations.

The main motive power on the "Snow Bug" consists of an Onan 10-hp air-cooled engine which was removed from a conventional Onan electric generating plant. A variable-high speed drive has been put on the "Snow Bug" by using a Salsbury 1500D clutch and fed into a three-speed motorcycle transmission, with a reverse gear included. The machine is capable of making up to 13 mph in deep snows. It has made a test climb at the steep ski lift at Whitefish, Mont., and has climbed other mountain slopes covered with deep snow.

According to A. E. Zion, communications engineer for the Montana State Highway Department, the machine has about the same bearing value on loose powdery snow as a man on snow shoes. This means it will sink only about 2 feet into such snow.

The only real problem according to Zion, is using the "Snow Bug" in high wind-swept ridge country having patches of bare ground. It can be done if the crew is careful, but there is a danger that carelessness will result in some damage to the drive chain and grousers.

The machine has now been developed to the point where it is of vital importance in maintaining Montana's growing communications network during the winter. It can be loaded very easily onto a small trailer towed by either a passenger car or a truck. It just fits into the back end of a Dodge power wagon and is often transported that way to areas where it is needed. Today, the Montana State Highway Commission is gradually giving the state's mountainous areas full radio coverage, even though the steep mountainous terrain has made it necessary to locate repeater stations far off the beaten paths. The powerful little "Snow Bug", taking men and equipment to these out-of-the-way places which other vehicles cannot reach, is helping the commission finish the job.

THE END

Loaded with a batch of hot-mix, a Ford truck moves off from the contractor's Madsen asphalt plant. During most of the job, the plant turned out 2,375 tons of material per ten-hour shift.

Ray Day Photos

High-speed equipment paces bituminous paving

Spread keeps up with high rate of plant-mix production; work on 24-mile improvement includes 17 miles of widening

Setting an average ten-hour production rate of 2,375 tons for many weeks, Silver State Construction Co., Inc., Fallon, Nev., rushed its one-season 24-mile paving job on U. S. 50 east of Dayton, Nev., completing the contract last fall.

The $416,000 contract covered the 24-mile improvement on a section of U. S. 50 which rises from the valley floor to go through the gently rolling foothills leading to higher mountains in the east. About 17 miles of the stretch already had a good alignment and a good 20-foot road-mixed bituminous surface. Both sides of this section were widened, making the road 26 feet in width. For the remaining 7 miles, new grading, some alignment change, better sight distances, adequate subbase, and more room to throw winter snows was required.

Though the 24-mile job isn't particularly long for Nevada, contract quantities were sizable. They included 116,510 cubic yards of roadway excavation, 64,000 tons of plant-mix, 80,000 cubic yards of borrow material, and 51,000 tons of 1-inch-minus gravel. Widening strips on both sides of the old road vary from 2 to 3½ feet. On the 7 miles of new construction the roadbed was built 32 feet wide, with 6 inches of Type II gravel laid for the base course. A 2½-inch plant-mix surface, 26 feet wide, comprises the pavement which is flanked by 3-foot shoulders.

Widening

The widening of the old pavement moved so rapidly that progress was measured in miles per day. The widening trench, 3 inches deep from the surface of the old asphalt mat, was dug by a special cutting blade mounted on the moldboard of a Caterpillar No. 12 motor grader. The grader averaged more than a mile an hour in some sections. Excavated dirt, shoved up to the outboard side of the shoulder, was later blended into the job. Since the highway runs through good granular material, the base beneath this widening strip is considered adequate.

Since the subgrade under the widening trench was disturbed by the cutting shoe, it was recompacted by a Galion roller which worked behind the motor grader.

The 3-inch course of plant-mix

A batch truck begins dumping its load of about 9 tons of plant mix which the Apsco machine will lay in a 3-inch lift over a 120-foot-long section.

The widening strip of asphaltic concrete laid by the Apsco is compacted by a Buffalo-Springfield tandem steel-wheel roller. The machine covers 5 miles in a 10-hour shift.

widening material was spread at high speed by an Apsco widening machine. Fed by batch trucks which hauled approximately 9.7 tons per trip, the Apsco machine rolled rapidly up the highway, taking a minimum of time to stretch an average truck load over a 120-foot stretch. Covering as much as five miles in one ten-hour shift, the widener was capable of handling an output of 240 tons per hour from the hot plant.

The widened asphalt strips were compacted immediately by a Buffalo-Springfield tandem steel-wheel roller, ballasted to approximately 10 tons.

Since the old asphalt surface was considerably oxidized, it was given an application of 0.05 gallon per square yard of MS1 emulsion diluted with 40 per cent water. This was applied as a fog coat by a 2,600-gallon Rosco pressure distributor mounted on a Peterbilt truck. The tack coat was opened to traffic almost immediately, and there was no apparent pickup on tires of passing automobiles.

Speedy Paving Setup

The paving spread was kept supplied by a 4,000-pound Madsen all-electric asphalt plant. A 150-hp Caterpillar D1300 diesel engine powered the pugmill, which had 28 paddles. The injection of 120 to 150-penetration asphalt cement is under continuous pump pressure. Two mixer men, who alternate positions every 30 minutes, cut down the number of bad batches turned out.

A 150-kw Palmer generator, driven by a General Motors engine, supplies electricity for the motors around the plant.

Batches consist of 3,800 pounds of mineral aggregate filler and 5 per cent or 190 pounds of 120 to 150-penetration asphalt cement. Asphalt, from the Union Oil Co. Refinery at Oleum, Calif., was trucked to the job by Asphalt Service Co. All mineral aggregate for the hot plant-mix was produced at the plant site.

The rock plant, which hit a peak production of 575 tons per hour, consisted of a 3-foot Symons cone crusher, a Link-Belt vibrating screen which scalps off chips ½ inch and smaller, and a conveyor belt which ties the plant together. Material passing the 1-inch Link-Belt vibrating screen and retained on the No. 10 screen is sent to the chip pile to be used in the seal coat. The plant is fed by a Model 6 and Model 41 Northwest shovel discharged through a surge bin to hauling trucks. These deliver the crushed material to the asphalt plant a few hundred feet away. This same plant also produced subbase material needed in the new sec-

(*Concluded on next page*)

After the widening trench is excavated by a motor grader, the subgrade is recompacted by this Galion steel-wheel roller which works just ahead of the Apsco widener.

(*Continued from preceding page*)

tions of the road.

At the hot plant, there was storage capacity for 65 tons of 120 to 150 asphalt and 5,500 gallons of PS-300 burner fuel. On the longest hauls, as many as 18 batch trucks were used to carry close to 10 tons of material per trip. As a general rule, the stockpile of mineral aggregate has been dry, seldom exceeding four per cent.

Out on the highway, a Barber-Greene tamping-leveling finisher, widened to 13 feet, laid the 2½-inch course. Knockdown and finish rolling was applied by a Buffalo-Springfield three-axle tandem and ordinary tandem steel rollers. Wherever necessary, flagmen were stationed at both ends of long paving sections and, with the help of a pilot car, traffic was carried safely through the job. Since the job was set up for a high daily average production rate, Silver State's paving operations took a relatively short time.

New Sections Built

The seven miles of new grade change and realignment posed no special earthmoving problems. The job consisted mostly of medium cuts and fills in alluvial fan material which was not too difficult to dig or haul. The yardage was moved mostly by LeTourneau-Westinghouse Tournapulls, assisted by push-tractor loading, and in a few cases by additional ripping. The material was spread in 6 to 8-inch lifts on the fills and compacted by sheepsfoot rollers and the passage of loaded vehicles. Additional moisture was added by four 2,000-gallon and one 4,000-gallon water trucks. All slope lines were cut and rounded by motor-grader blades.

Routine also was the method of laying down granular subbase. This material was hauled from the crushing site to the road by dump trucks, laid according to taped distances by direct dumping, and then roadmixed thoroughly with the water as water trucks and motor graders passed repeatedly through the material. A uniform distribution of rock particles and moisture was obtained before final rolling was done by pneumatic machines.

Personnel

The Nevada Department of Highways exercised general supervision of the job under H. D. Mills, state highway engineer, who was assisted by J. D. Meacham, construction, maintenance, and secondary roads engineer; and Owen Joseph, resident engineer. The contractor's operations were under the general supervision of A. D. Drumm, Jr., president of the company. He was assisted by J. V. Beach, general superintendent; Russell Fields, assistant superintendent; and Jay Montrose, laydown foreman.

THE END

Pile-Driver Hose Marked As Safety Precaution

■ To prevent the inadvertent use of an unsafe hose in pile driving, Goodall Rubber Co. is now furnishing its Inferno steam hose with an easily identified black spiral stripe bonded to the regular red synplastic cover.

The company points out that this steam hose has always been made to specifications emphasizing the safety factor, thus providing a guard against bursting. It adds that risk of accident is now further reduced by the use of the special marking on the hose.

For further information write to the Goodall Rubber Co., Whitehead Road, Trenton 4, N. J., or use the Request Card at page 18. Circle No. 281.

Use of Straddle Carriers For Hauling Materials

■ A new booklet tells how straddle carriers, long used by the lumber industry, are now finding application in many other types of material handling. Among advantages straddle carriers offer are one-man handling of hundreds of tons of material per day, a loading and unloading time measured in seconds, and road speeds up to 56 mph. According to the literature, one straddle carrier replaces two or three conventional trucks.

The section in the booklet covering the construction industry shows the straddle carrier transporting precast-concrete sections, steel piling, and bridge girders.

To obtain this literature write to the Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich., or use the Request Card at page 18. Circle No. 379.

Battery-Charging System Saves Equipment Downtime

■ A newly designed alternator charging system makes it possible to provide on-the-spot battery charging for rolling equipment to minimize downtime. The charging system is easily installed in a conventional service vehicle in place of a standard generator. The complete rig consists of the alternator, a rectifier to change the alternating current to dc, and a special regulator.

In addition to minimizing downtime and providing fast service, the charging rig also reduces the number of spare batteries that must be kept on hand.

For further information write to Leece-Neville Co., 5109 Hamilton Ave., Cleveland 14, Ohio, or use the Request Card that is bound in at page 18. Circle No. 348.

New Office for Mayo

The Mayo Tunnel & Mine Equipment has moved to new quarters at 1340 Harrisburg Ave., Lancaster, Pa. The company formerly had offices at 650 High Street.

Remote Control Unit for Mobile Radio Equipment

■ Two-way mobile radio systems can be remotely controlled by a new small Du Mont desk unit, the Remote Control Unit Type MCA-902-A/B. The equipment permits the operator of a two-way commercial radio system to install a base station at an advantageous location—such as a hilltop or the roof of a tall building—and control the unit's transmission and reception from his desk.

The new Remote Control Unit is designed for use with Du Mont Base Station Equipment MCA-151-A (25 to 54 mcs), MCA-351-A (144 to 174 mcs), MCA-450-A (450 to 470 mcs), MCA-451-A (460 to 462 mcs and 468 to 470 mcs).

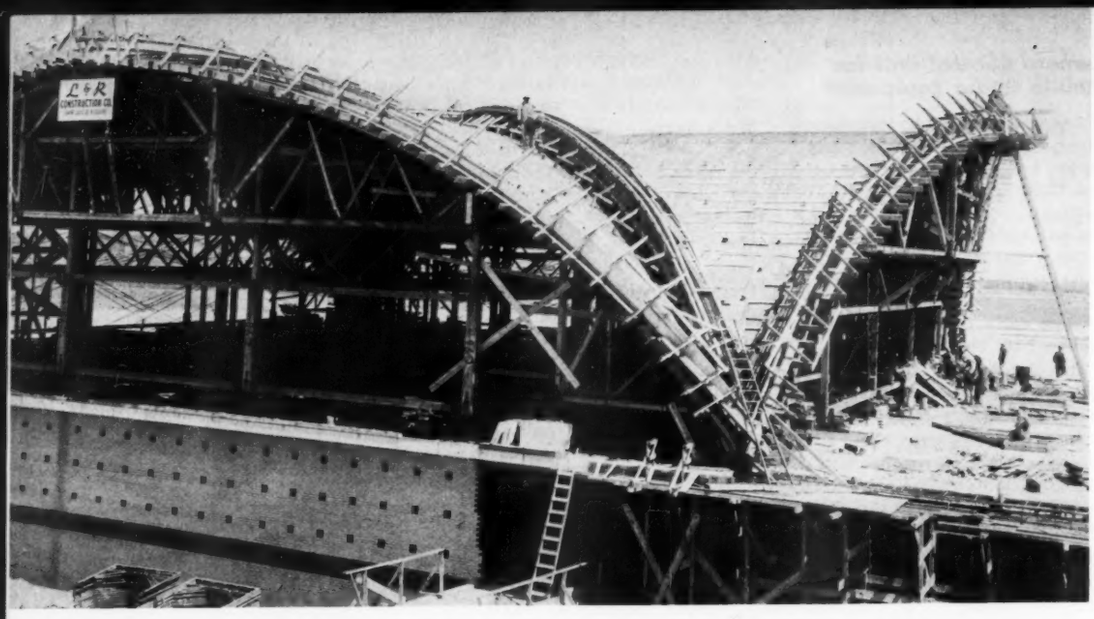
For further information write to the Allen B. Du Mont Laboratories, Inc., 750 Bloomfield Ave., Clifton, N. J., or use the Request Card at page 18. Circle No. 387.

Extra-Heavy-Duty Dump-Truck Bodies

■ A bulletin illustrating the features of Heil extra-heavy-duty Model HH-11 dump bodies has just been released. These bodies have heavy-duty structural steel underbody construction, single sheet steel sides, one-piece corner posts, and double-acting tailgates.

A special Model HH-11 dump body illustrated has added features like vertical and horizontal box-bracing on the sides, heavy-duty extension sides, a large protective cab plate, and dirt deflectors. Models covered include units of 4 to 12.3-cubic-yard capacity.

To obtain Bulletin No. BH-54110 write to the Heil Co., 3003 W. Montana Ave., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 354.



Horizontal and vertical curvature of the thin-shell arch roof form is visible from the southeast corner of the terminal. The double-barrel form for the building was fabricated by Timber Structures, Inc., Portland, Oreg.

C&E Staff Photos

Concrete is delivered to a hopper on the third floor level by a Manitowoc crane. For lower lifts, this crane and a similar machine placed concrete directly with 1-yard dumpbuckets.

Portable falsework supports forms for arch roof

Airport terminal has thin-shell concrete arch roof, supported only at four corners

An ingenious system of portable falsework supports the forms for the thin-shell concrete arch roof sections of the new terminal building being constructed at Lambert-St. Louis Municipal Airport, St. Louis, Mo. This falsework system is rolled on rails from one pour to the next in eleven separate sections.

Designed by Roberts & Schaefer Co., Chicago, Ill., the timber falsework was fabricated in Portland, Oreg., by Timber Structures, Inc., and assembled on the construction site by L & R Construction Co., Inc., St. Louis, Mo., which is general contractor for the $4,500,000 project.

The terminal building, with its very unusual roof, was designed by Hellmuth, Yamaski & Leinweber, architects, and Wm. C. E. Baker, structural engineer, both of St. Louis, and is being built for the Board of Public Service of the City of St. Louis.

Supported only at the four corners, the roof units consist of intersecting thin-shell concrete cylinders. Arch ribs extend diagonally from the pin connections in the four corners and intersect at the center. Each of the three roof sections covers an area 120 × 120 feet or 14,400 square feet. The shells are 32 feet high at the crown and have a uniform thickness of 4½ inches. Diagonal ribs are 18 inches wide and taper in depth from 10 feet at the corners to 3.9 feet at the top. The ribs are above the shell at the top and project both inside and outside the roof near the spring line. Bays 26 feet wide between the arches give the structure a total length of 412 feet. Its width is 120 feet.

At present three units are under construction, but plans include provisions for adding another unit to the western section and two more to the eastern section when necessary.

Taking advantage of a hillside location on the south side of the field, the three-story terminal building has its street entrances at the third or passenger-floor level. At the second floor, a series of fingers reach far out onto the parking apron for passengers moving to and from planes. The first floor, at apron grade, is primarily for service use.

These lower two floors are of conventional reinforced-concrete frame construction and have a solid brick and glass-block wall to the south. The other three sides are brick to sill height and have aluminum windows. The third floor is an open room covered by the roof arches. Its side walls.

The entire roof—including arch ribs,—is poured at one time as concrete blocks hold the rib forms 4½ inches above the deck form. Bolts through the concrete blocks tie the forms together.

entirely of glass, have steel mullions covered with aluminum.

Concrete Placed in Winter

The two lower floors of the terminal building are of conventional flat-slab concrete-frame construction, except for the roof supports. Heavy steel columns, made up of 36 × 1-inch web plates and 8 × 6 × ¾-inch flange angles are encased in the second-floor concrete and extend up to support the roof. Between these columns, continuous peripheral beams surround each section at the third-floor level. Encased in these concrete beams are two continuous steel plates, 1 inch thick and 18 inches wide, designed to resist the outward thrust of the arch roofs against the supporting columns.

Spread footings on a hard sand and clay subsoil carry the building loads to the earth at about apron level. Site grading was done with draglines and tractor-scrapers, with all of the dirt being retained on the site. Footing holes were excavated with clamshell buckets and the footing concrete was placed directly from ready-mix trucks. The flat-slab floor system with drop panels is supported on columns with capitals. The floors were formed with form panels made up of ¾-inch plywood backed up with 2 × 4's. These panels spanned over 4 × 4 joists supported on 4 × 4 shores with Ellis shore clamps for convenient adjustment.

Concrete was placed by a Manitowoc 2000 crane and a Link-Belt Speeder K-360 using 1-yard bottom-dump buckets. For lifts which the cranes could not reach, concrete was bucketed to two Gar-Bro twin hoppers, then loaded into buggies to be transported to the forms. Three Bell Prime Movers transported the concrete with assistance from hand buggies when necessary. Jackson electric vibrators compacted the mix. Concrete placing on the lower stories started in October, 1953, and continued through the winter. During cold weather, heated concrete was supplied. Forms were protected by canvas enclosures heated with Silent Glow oil-burning heaters. Exposed slabs were covered with straw and canvas in addition to being heated from below.

Each of the three arch roof sections was formed and cast as a unit. Rails were laid on the third-story concrete floor, permitting the form to be rolled from one position to another. Transverse tracks were also required to move the several pieces of the falsework laterally into position. The trusses making up the falsework were received on the job completely knocked down, with individual pieces identified by number for erection. The several units were assembled on the ground, hoisted to the floor by crane, and rolled into place on the rails.

When properly positioned, the falsework was packed up several inches off the rails to proper grade and alignment, and supported there on timber cribs. After the first pour, the upper parts of the form were stripped and the falsework lowered to the rails. Then the eleven pieces of the falsework were juggled in a series of movements to their position in the second section.

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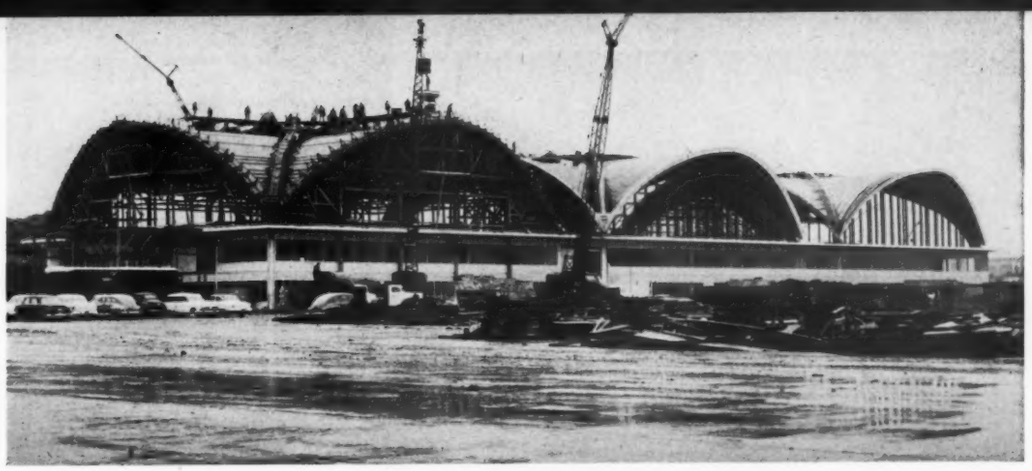


Concrete for a pour high on the Lambert-St. Louis Municipal Airport terminal, bucketed to a Gar-Bro twin hopper on the roof, will be taken along a runway to its point of placement. Lower lifts were placed directly by crane.

Workmen tighten connecting bolts after the form has been brought to line and grade. Each piece of the falsework is numbered for easy identification and erection at the site.

C&E Staff Photo

(Continued from preceding page)

The roof form consisted of 2×8 joists spanning between the falsework trusses with a 1-inch lumber deck. Where the overhanging portions of the roof were to remain exposed, the forms were lined with Masonite to provide a smooth surface. Arch ribs were formed with 2×4 studs and double 2×6 wales with 1-inch lumber sheathing. Superior coil ties held the sides in proper position. The entire arch rib form had to be supported 4½ inches above the deck to allow for the roof thickness. This was accomplished by the use of precast-concrete spacer blocks. Holes in the blocks received bolts which tied the rib forms to the roof.

Placing approximately 400 cubic yards of concrete for one roof section in a continuous pour required careful planning and preparation. The four corners and a portion of shell were reached by cranes and buckets and the remainder of the concrete was placed with buggies from runways. Two runways were constructed in each quarter of the roof, one near the top and the other part way down the steep slope. Runway floors of plywood panels were supported on specially fabricated Universal pipe scaffolding framework which raised the platform high enough above the roof to clear the diagonal arch rib form.

To provide for speedy delivery of concrete to the roof, a steel hoisting tower was set up to augment the two cranes on the first pour or shell. The skip in the tower was handled by a Clyde 2-drum hoist powered by a Minneapolis-Moline engine. The Link-Belt Speeder and Manitowoc cranes with 1-yard buckets started placing concrete at the corners, continuing to work until they could no longer reach the forms. Then they bucketed to the Gar-Bro hoppers to supply buggies which were wheeled over the runways. The second shell was placed by four cranes, one working at each corner. This cut placement time in half.

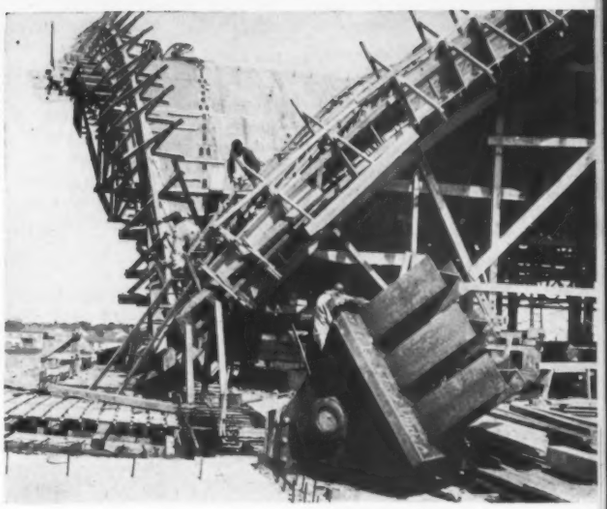
Concrete was dumped on the deck and screeded to shape with a Master vibrating screed equipped with a ¾-hp Briggs & Stratton engine. The 10-foot screed was shaped to the curvature of the roof deck. Ready-mix concrete was supplied by Majestic Building Materials Co., St. Louis.

Has Copper Roof

After concrete had cured, 2×4 sleepers were laid at 2-foot centers over the concrete roof and attached to the concrete by the use of Ramset powder-actuated tools. Fiberglas in-

When the form is ready to be moved to another area, the timber cribbing which supports the form is removed and the form is lowered to rails by Simplex jacks.

C&E Staff Photos



Arch rings of the roof are tied to the column below by 8-inch pin connections, such as this one. These will be left exposed in the completed structure, but the I-beam grillage will be encased in the concrete of the arch ring.

sulation was placed over a vapor barrier, and the entire roof was covered with ⅜-inch treated plywood. Copper roofing was applied over the plywood for the finished roof.

A peripheral beam around the edges of the roof arches is faced with gray stone which was installed in the forms prior to casting the concrete. Inside, the ceiling will be lathed and plastered.

Enclosed Passageways

Along the south side of the building are a drive and docks to accommodate freight trucks. A concrete retaining wall supports the high bank adjacent to the drive, and pedestrian bridges from the street to the passenger floor span the two-story chasm. A trucking concourse 17 feet wide extends the full length of the first floor and out to the parking apron, providing access for vehicles delivering food, freight, mail, and supplies to the planes. The apron floor will house an extensive flight kitchen for the preparation of meals to be served aloft. Other facilities on this floor include airline operations offices, freight facilities, U. S. airmail

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facilities, and air conditioning equipment.

Ramps inside and outside the building from the apron level to the second floor will accommodate trucks handling passengers' baggage. This floor will also house administrative offices and passenger service facilities. Escalators and elevators will carry passengers between this floor and the main passenger floor above. Passengers going to or arriving from planes will travel through enclosed fingers extending from this level far out into the apron in three directions.

The west finger projects 210 feet from the terminal, then turns and extends 260 feet northwesterly out onto the apron. An observation deck on the north finger extends 560 feet straight north from the terminal. The east finger extends 620 feet east and northeast. Steel columns support the concrete floors of the passageways. Walls are of masonry block, with a sprayed-on cement coating. Escalators carry passengers up and down the 12-foot lift from the apron to the finger floors.

One of the unusual construction features of these fingers is that practically nothing is level or plumb. Floors slope 1 inch in 10 feet to match the apron grade, and walls and windows are perpendicular to the floor instead of being plumb. Fingers are about 21 feet wide, although this width varies. They are heated in winter, but not air conditioned. However, they carry snorkle-like attachments for air conditioning planes standing on the apron.

Other Units

Three separate buildings are being constructed to the west of the terminal building as part of the same project. One is a 61×174-foot shop and boiler house which will include the heating plant for the entire project. An underground tunnel about 8 feet square connects the boiler building with the terminal building and extends completely under the latter. Pipes for water and steam, ducts for wiring, and other utilities are located in this tunnel.

The other two auxiliary buildings are an airline service structure measuring 61 × 121 feet, and a cargo building measuring 145 × 50 feet. All are steel frame structures with concrete floors and roofs with brick and glass walls. Since the area in which the new terminal is located is not served by a sanitary sewer system, an independent sewage system which includes a large septic tank is being constructed under the contract.

Most of the passenger facilities are located on the third or passenger floor. Here are an ultra-modern kitchen and a spacious dining room, ticket offices, passenger waiting rooms, and concessions. With the exception of the kitchen which has a ceiling at the 8-foot level, these facilities are all in one big room with the high arched dome ceiling above. In the four corners of each of the three sections, the 8-inch pin hinges, which are the only connection between the roof and the remainder of the building, will be exposed. Insulated downspouts to carry roof water will also be visible in these corners. Since there is no connection between the roof and the remainder of the building except through the hinges, ducts from kitchens must go out through the sides of the building.

Ground was broken for the terminal on April 9, 1953. Concrete placement started on the lower floors that fall, and continued through the winter and into the summer of 1954. Roof sections were placed in the summer of 1954. The entire structure is scheduled for completion late in 1955.

Personnel

Supervising the project for L & R Construction Co. is William Dunn. Project engineer is W. C. Guse. Representing Hellmuth, Yamaski & Leinweber on the project are E. A. Schmitz, resident engineer, and his assistant, R. C. Roberts. Chief engineer of the St. Louis Bridges and Buildings Section of the Board of Public Service is W. R. Crecelius.

THE END

Wire-Rope Assemblies

■ A new catalog illustrates Macwhyte Safe-Lock wire-rope assemblies. The assemblies consist of flexible wire rope with permanently attached fittings of various types and sizes. Terminals are swaged to the wire rope, which may be of bright or galvanized carbon steel, stainless steel, or monel metal.

To obtain this literature write to Macwhyte Co., Kenosha, Wis., or use the Request Card at page 18. Circle No. 356.

Malleable Pipe Couplings

■ A new folder on malleable pipe couplings and fittings has been released by Gustin-Bacon Mfg. Co., 210 W. Tenth St., Kansas City 6, Mo. Rolagrip couplings for plain-end pipe and Gruvagrip and Gruvajoint couplings for grooved pipe are illustrated.

Diagrams and complete specifications for these products as well as for Gruvagrip fittings, are included.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 364.

Catalog on Asphalt Plants Shows Layouts Available

■ A new catalog covering the complete Standard Steel line of RB asphalt plants and accessories is available upon request. The literature shows how various basic units can be combined to give the exact plant capacity, layout, and efficiency required.

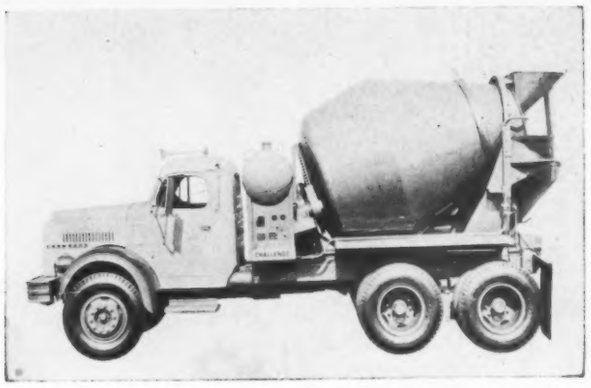
Information presented includes layouts available, flow charts, and data on all major parts. Accessories described range from storage and loading bins to portable and semi-portable cyclones.

To obtain this literature write to the Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 58, Calif., or use the Request Card at page 18. Circle No. 363.

Two New Engines Described

■ A technical bulletin prepared by the industrial engine department of Willys Motors, Inc., 1015 N. Cove Blvd., Toledo, Ohio describes two six-cylinder industrial engines. Power curves, engine specifications, and a discussion of special features are among pertinent information included in the illustrated booklet.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 361.



The new Challenge Pacemaker.

Improved Truck-Mixer Line Offers Shorter Models With Sturdier Drums

■ Offering models in a large number of sizes and in several types, the Cook Bros. Equipment Co. of Los Angeles announces the new Challenge Pacemaker truck mixer for 1955. The Pacemaker is available in eight sizes ranging from 3 to 8 yards in capacity. It is also made in four side-engine models ranging from 5 to 6½ yards in size and two power-takeoff models which are 3 and 3½-yard units. All models are reported to mix ½ yard more concrete than the rated capacity.

The shorter over-all length of the new Pacemaker moves the center of gravity forward so that the mixer can be used on a truck with a shorter wheelbase. Also the drum diameter is larger than that of earlier units to provide a greater mixing area. The drum is made of 3/16-inch high-tensile steel plate that is abrasion and corrosion resistant.

An important new feature is the Mixometer that shows the number of drum revolutions per minute and also gives recommended speeds for best results in charging, mixing, and agitating. The device will also record the total number of drum revolutions per trip and gives a running total number of revolutions for the life of the mixer.

For further information write to Cook Bros. Equipment Co., 3334 San Fernando Road, Los Angeles, Calif., or use the Request Card at page 18. Circle No. 394.

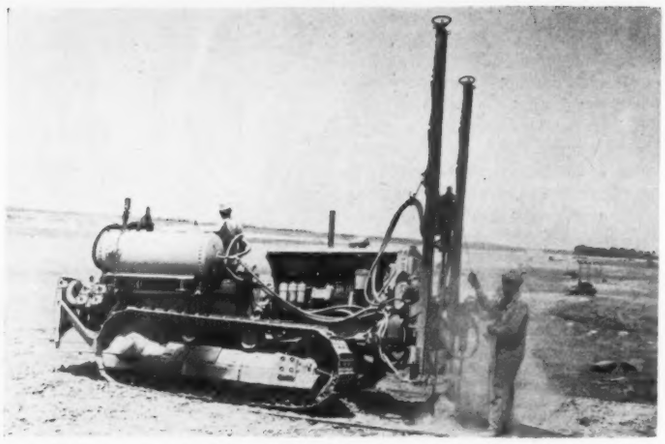
Line of Clamshell Buckets

■ The complete line of Haiss Multi-Sheave clamshell buckets is illustrated in a bulletin from the George Haiss Mfg. Co., Inc., subsidiary of Pettibone Mulliken Corp., 350 Fifth Ave., New York 1, N. Y. The bulletin shows ¼ and 1/3-cubic-yard trench buckets in addition to a line of general purpose digging buckets.

To obtain Bulletin No. H-1954 write to the company, or use the Request Card that is bound in at page 18. Circle No. 376.

L. B. Foster to Handle Taylor-Forge Pipe

The L. B. Foster Co., Pittsburgh, Pa., supplier of steel sheet piling and pipe, has been appointed exclusive national distributor of Taylor-Forge spiral-weld foundation pipe in 46 states. Distributorship on a nonexclusive basis has been granted to Foster in Texas and California.



Blast holes are drilled 18 feet into rock by this mobile self-contained drill rig consisting of two Ingersoll-Rand wagon drills mounted on the front of a Cat D8. The tractor engine drives the I-R compressor through the power takeoff.

C&E Staff Photos

After being blasted and scarified, earth and broken rock are picked up by a Caterpillar DW21 scraper which is push-loaded by a Cat D8 tractor. When as much loose material as possible has been removed, the surface is again scarified.

Rock excavation makes airport grading tough

With roughly half of the 3,350,000 cubic yards of unclassified excavation at the Little Rock, Ark. Air Force base consisting of rock, the joint venture contractors on the grading work had to blast and scarify the material before it could be moved. Yet even after the blue sandy shale was blasted, ripped, loaded, and spread, some of the rock—still too large to meet specifications for the upper layer of the fill—had to be broken up and pounded into the fill by drop-hammers mounted on Caterpillar tractors.

Grading for the 10,100-foot-long runway and adjacent taxiways and aprons was completed last year by D. B. Hill, Little Rock, Ark., and S. E. Evans Construction Co., Fort Smith, Ark., under a $1,295,451 contract. Currently, contractors are completing paving work and building construction at the 6,400-acre tract which was formerly the site of the Arkansas Ordnance plant.

The grading contract included work on the 10,100-foot-long and 600-foot-wide runway on which a 200-foot-wide pavement will be laid, a parking apron 1,150 × 8,000 feet, connecting taxiways, and a maintenance hangar site. The work was divided into two sections, designated Lots I and II. Lot I, the western half of the area, included more than two thirds of the excavation and most of the rock. The Hill organization started on Lot II and S. E. Evans on Lot I, and Hill's crews assisted Evans, after work in Lot I was finished.

Clearing

The buildings of the old ordnance plant—including some concrete stor-

More than three million yards of material is moved in work on runway and apron at new Air Force Base

age igloos—railroad tracks, roads, and brush had to be demolished or removed before the grading could begin. Railroad tracks which ran throughout the area were removed, but rails, track hardware, and good ties were salvaged. Some old pavements were broken up and removed.

Three culverts, each 428 feet long, were constructed under taxiways prior to the grading. Two of these were 42 inches in diameter and the third, 54 inches. Extra-strength tongue-and-groove reinforced-concrete pipe was placed and joints were sealed with rubber gaskets.

With the preliminaries out of the way, Evans' crew started digging into a rock ridge which roughly paralleled the runway in the Lot I area. Although the rock was too hard to move without blasting, it could be drilled easily, making mobility in the drilling equipment essential. This mobility was obtained in a self-contained tractor-mounted unit. Two Ingersoll-Rand wagon drills were mounted on the front end of a Caterpillar D8 tractor, and a 500-cfm Ingersoll-Rand compressor, driven through the power takeoff by the tractor engine, was mounted on the rear. This rig drilled fast, moved to new locations

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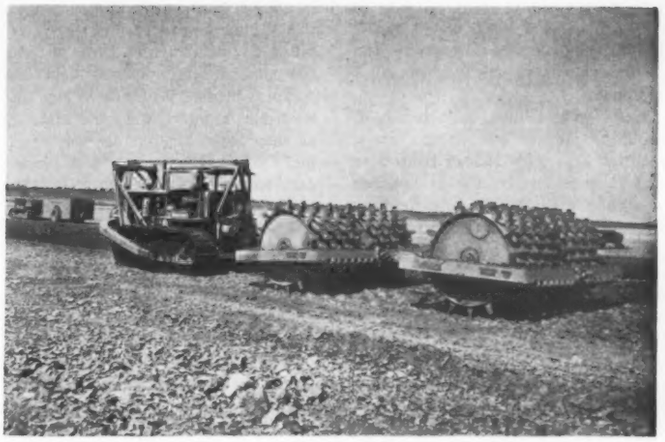


Gebhard double-drum sheepsfoot rollers, pulled by a Cat D8, help to break up rock as they compact the runway fill. Altogether, 3,350,000 cubic yards of material was excavated for the air-base job.

▲ This drop hammer, mounted in Traxcavator frame on the front of a Caterpillar D4 tractor, is used to break up large pieces of rock on the fill. Rocks which could not be broken are pounded deep into the lift.

(*Continued from preceding page*)

quickly, and left no hoses on the ground to get in the way of other equipment.

Holes were drilled to a depth of about 18 feet or less as the grade required and were spaced from 6 to 10 feet on centers both ways. Loading was done with 40 per cent Hercules Hercomite, which was detonated electrically. Drilling and loading continued throughout the day, and the day's blast was detonated at 4:30 p.m. when the day shift had left the site.

Haul with Scrapers

Practically all of the material was loaded and hauled with scrapers. Evans used six LeTourneau scrapers pulled by Caterpillar D8 tractors. Five of these were Model W's and the other was an FP. In addition, four Caterpillar DW21 and three Euclid rubber-tire scrapers were used. Five Caterpillar D8 push tractors, three of them the new special models, kept the scrapers loaded. When these rigs had loaded as much of the loose material as they could, the surface was scarified by two LeTourneau K-30 rippers and a Caterpillar ripper pulled by D8's. These rigs continued to scarify as the scrapers removed the loose material to the full depth of the cut.

On the fills, the scrapers spread the material in loose lifts, 8 to 12 inches deep, with the help of Caterpillar D8 and D7 tractors and dozers. Double-drum Gebhard sheepsfoot rollers pulled in tandem by Caterpillar D8 tractors started compaction of the layer. After a few passes by the sheepsfoot rollers, four water wagons applied water to the material to bring the moisture content up to optimum. One of these units was a 5,000-gallon tank pulled by a Euclid; the others were 2,000 to 3,500-gallon truck-trailers. Water was obtained from the Jacksonville municipal supply which has wells within the base area. More than 31,000,000 gallons of water was applied for compaction and dust control.

After the water application, each layer was thoroughly rolled with a Ferguson 50-ton rubber-tire roller pulled by a Caterpillar D8, so that the required compaction could be obtained with lifts of loose material up to 2 feet thick. The sandy-shale rock broke up well under the handling and compacting operations, and only a few large pieces were left in the compacted layers.

To break up these few remaining pieces, the contractors devised a drop hammer mounted on the front of a Caterpillar D4 or D6 tractor. One of these rigs consisted of a short set of leads attached to a Traxcavator frame on the front of a D4 tractor. The tractor operator handled the drop hammer with the Traxcavator cable controls. As the machine traveled over the compacted fill, a helper spotted the large rocks and guided the tractor operator so that the leads were directly over the rocks. One or two drops of the heavy hammer either crushed the rock pieces or buried them deep in the layer.

Although D. B. Hill's operation included more of earth and less rock excavation than Evans' its equipment spread was similar. Nine LeTourneau FP scrapers pulled by Caterpillar D8's took care of most of the short haul work. Longer hauls were handled by five Euclid scrapers. Where the cuts were deep and hauls exceptionally long—as in the grading of the site for the maintenance hangar—some of the material was moved by a Northwest Model 95 shovel and three end-dump Euclids, augmented, when necessary, by some of the Euclid scrapers.

A Caterpillar D8 and Cat ripper loosened the rock, and three D8's push-loaded the scrapers. Spreading and compacting were done by Cats with dozers, double-drum Gebhard sheepsfoot rollers pulled by D8's, and Ferguson 50-ton rubber-tire compactors pulled by Allis-Chalmers HD-20 tractors. Adams 610 and 660 motor graders, and a Cat D4 with a Tampo rubber-tire roller put the finishing touches on the grade.

Longest hauls by the rubber-tire scrapers were in excess of 3,000 feet, although haul averages were in the 1,000 to 1,500-foot range. Tractor-drawn scrapers were normally used on hauls of less than 1,000 feet. Even with the rough material and long hauls, the crews moved 15,000 to 18,000 cubic yards of excavation per 9-hour shift. Early in the job, the work was run on two 10-hour shifts 7 days a week. Later this was reduced to a single 9-hour shift except for watering and rolling operations, which continued on a two-shift basis throughout the job.

Runway, taxiways, and apron are being paved with concrete and bituminous pavements under a separate contract by Tecon Corp., Dallas, Texas. The parking apron, taxiways, and 1,000 feet of each end of the runway will be 15-inch-thick concrete pavement. The inner 8,100 feet of runway and other areas will consist of bituminous paving of various thicknesses and of compacted base.

Personnel

D. B. Hill, Jr., was in general charge of the project with Secratus Lawrence as superintendent of the Hill spread and Oliver Cranfield superintendent for Evans Construction Co. Chief engineer was J. P. Cheek.

The project was supervised by the Little Rock District of the U. S. Army Corps of Engineers of which Col. Staunton L. Brown is district engineer. Arthur G. Carlson was project engineer in direct charge of the work, and J. W. Story was assistant project engineer. THE END

Remember next month is Red Cross month. Let us all respond generously in answering the call of those in need.

The Link-Belt Speeder Corp., which has been introducing new machines in a number of popular classes, has just announced the ½-yard model LS-58. Important feature of the line of excavators is the Speed-o-Matic power hydraulic controls.

New ½-Yard Model Joins Line of Excavators Featuring Power Hydraulic Controls

■ The introduction of a new ½-yard shovel-crane to its line has been announced by the Link-Belt Speeder Corp., Cedar Rapids, Iowa. The LS-58 in many respects is typical of a series of popular-class excavating machines and lifting cranes recently introduced by the concern.

The key feature of the new Link-Belt Speeder shovel-crane is power hydraulic Speed-o-Matic controls which are reported to respond smoothly and instantly to fingertip control. This ease of operation allows the operator to remain alert throughout the shift.

The upper machinery on the shovel-crane is built to handle the faster operating cycles of the Speed-o-Matic control and up to 55 net usable horsepower. Mechanical advantages of the LS-58 include alloy cast-iron clutch shells and its extensive use of antifriction bearings and spur gears with machine-cut teeth. All shafts are splined and the large diameter, two-shoe, internal expanding Speed-o-Matic clutches can be reached easily for maintenance.

The crawler base on the LS-58 is all-welded and stress-relieved for strength and resistance to impact. The machine's 53-inch-diameter turntable provides greater stability and eliminates center-pivot up-pull, according to Link-Belt Speeder engineers.

Three crawler lowers are offered: the standard lower, 10 feet 3 inches long; the intermediate lower, 11 feet long; and a long-wide lower, 12 feet 1 inch in over-all length.

Optional features of the excavator include independent swing and travel, reversing clutches for either or both front and rear drums, and a retractable high gantry.

For further information write to the company, or use Request Card at page 18. Circle No. 399.

Perhaps you can help save a life by ordering a $10 CARE food package for delivery to a needy person overseas. Send a contribution to CARE, 600 First Ave., New York, N. Y.

Folder Gives Details on Versatile Forming System

■ Illustrating the Symons forming system, a catalog just released emphasizes the erecting and stripping advantages of Symons forms. The folder provides examples of the forms' adaptability in the construction of battered walls, round tanks, reinforced high walls, and mass-produced homes.

The system includes corners and fillers, pilasters, walers, waler ties, tightening wedge, short connecting bolt, two-way form tie, and long connecting bolt and waler plate. Symons shores, column clamps, bar ties, and tie chairs are also covered in the booklet.

To obtain this literature write to Symons Clamp & Mfg. Co., 4249 Diversey Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 365.

Centrifugal Throwers For Bulk Materials

■ A new bulletin covering the Swiveloader line of fixed and portable centrifugal thrower units for loading or storing materials has been released by the Stephens-Adamson Mfg. Co., Aurora, Ill. These units have high-speed belts which run in a concave path at the loading point. As the material leaves the belt, it is thrown for a distance of 35 feet or more. The throwers handle practically any dry granular or lumpy material in particle sizes from fines up to 2½-inch lumps.

To obtain Bulletin 854 write to the company, or use the Request Card at page 18. Circle No. 386.

Alert maintenance crews keep roads free from snow

Varied terrain and snowfall pose unusual problems; highway division uses patrol system to clear roads

Though no heavy blizzards have hit the northern Montana area in the past few seasons, maintenance crews of the Great Falls Division of the state highway department are prepared for any eventuality. Today the public demands—and gets—clear roads for year-round travel, even in this country of heavy snows where the temperature can plummet as low as 62 degrees below zero.

Long before the winter season closed in, division maintenance engineer C. A. McGiffin and his crews began getting their snow-removal equipment into top-notch shape. Working under the supervision of Scott P. Hart, state highway engineer, crew members began necessary equipment maintenance early enough so that the machines were ready for work long before they were actually needed. Without this preliminary work, it is doubtful if their present job of keeping roads open could be accomplished.

Cover Large Area

The division covers about 530 miles of state and interstate highways in eight northern Montana counties. The terrain varies widely, the area encompassing high places like Rogers Pass as well as plains country. Oddly enough, one of the worst snow-removal problems occurs not in the mountainous section, but on a north-south highway at the base of the Rocky Mountains. Here, fast currents of air cause ground blizzards almost all winter long. Clearing work is frequently impossible, for the snow whipped up by these winds is sometimes so dense that a snowplow operator cannot see what he is doing.

Snowfall, like the terrain, also varies widely. Although an 8-inch fall is considered heavy in some places, 3 to 5-foot falls are common in the high mountain passes. To cope with heavy snowfalls, the division has located one large Snogo rotary at Great Falls and another at Augusta. A large V-plow is stationed at Dupuyer, and a heavy-duty one-way machine is located at Rogers Pass.

Crews Move Fast

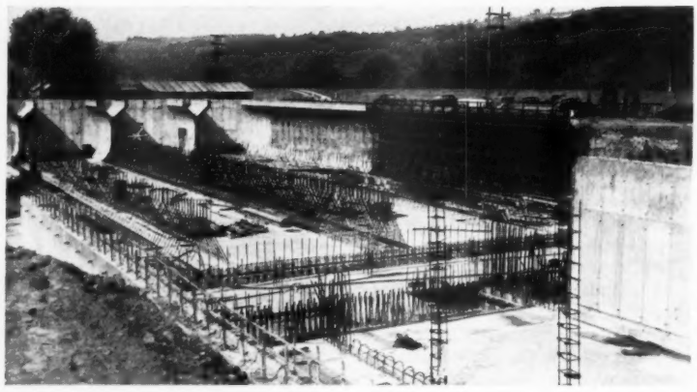
Maintenance men get to work immediately whenever a big storm is predicted. Generally, section foremen are out with push-plows the minute snow begins to fall heavily. First snowfalls occur by November. By January, snow removal is a prime maintenance problem, and it remains a problem until the end of March. Most of the winter snows are dry; heavy and wet snowfalls occur around April.

For safety and efficiency, the Great Falls Division uses 16 section foremen in a patrol system of maintenance on its highways. Each patrol is equipped with a one-way truck-mounted push-plow which is put to work as soon as snow begins to fall. This operation is particularly important in the northern section of the state, because a light snowfall can turn into ice on the roads the next day. One day, winter temperatures around Great Falls can drop below zero; the next day, a Chinook wind can sweep across the area to bring the temperature above the thawing point. Since these variations can cause snow to melt on highways one day and turn it to ice the next, snow crews must work fast to keep roads open and safe.

If ice begins to form or snow begins to pack, the division motor graders are thrown into the fight. These, equipped with Shunk serrated cutting edges on their blades, cut away a great deal of ice and packed snow each winter. In sections where stacking becomes a problem, the big Snogo rotaries periodically clear away the drifts or windrows. Even under the worst conditions, a highway in the Great Falls Division is rarely blocked for more than two or three days.

Behind winter operations in the division stands preparatory work which begins long before the snow falls. Maintenance crews treat back-

Unique Prefab Form System Speeds Sewage Plant "Y" Wall Construction



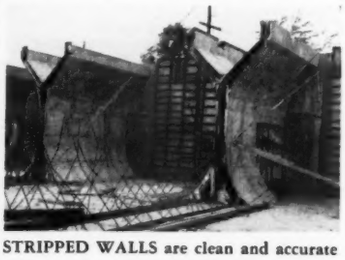
MECHANIZED FORMING with new "Y" wall trusses and UNI-FORM Panels speeds construction, saves labor and material

Field reports on a new system for forming "Y" walls in aeration tanks and settling basins indicate very satisfactory operation and important labor and material saving advantages for the system.

Developed by the Universal Form Clamp Co., Chicago, the new system is said to completely eliminate the many problems and difficulties encountered by contractors in forming this special type of wall in sewage disposal plant construction.

Specially designed trusses, which can be made to handle any type, height, shape or wall thickness, are used in conjunction with standard UNI-FORM Concrete Forms to form the "Y" wall. Assembly of the truss and UNI-FORM Panels into a complete form, ready to receive concrete is a fast, mechanical operation. Positive internal spreading and accurate wall thicknesses are assured by the use of Universal Spiroloc Cone Nut Assemblies.

Features incorporated in the design and operation of the Universal "Y" wall forming system eliminate the necessity of additional lumber or tying devices for the alignment and bracing of the unit.

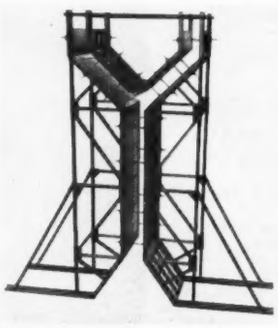


STRIPPED WALLS are clean and accurate

Erection, stripping and movement of the form can be handled either as individual pieces or as a large unit. Both methods have been very successfully used on recent projects.

Because standard UNI-FORM panels are used to form a large percentage of the "Y" wall contact area, it is possible to strip all UNI-FORM panels within a very short time after the actual pouring of concrete, leaving the trusses in place to provide the necessary support for the required period of time.

In this way, faster forming cycles, using minimum UNI-FORM equipment are possible, resulting in lower labor and material costs. UNI-FORM Panels are rented or sold, or rented with an option to purchase.



ASSEMBLED SECTION of "Y" wall truss with UNI-FORM Panels

For complete details on Universal "Y" wall forms and UNI-FORM Panels, Write:

UNIVERSAL FORM CLAMP CO.
1238 North Kostner Avenue
Chicago 51, Illinois
Distributors and Branches in Principal Cities

Completing one of the countless tasks involved in maintaining an efficient snow-removal organization, C. A. McGiffin, left, district maintenance engineer for Montana's Great Falls Division, makes a last minute check on a Snogo rotary.

Ray Day Photo

slopes in summer. Frequently, motor graders are used to round off the top of a highway cutslope so that winter winds will be able to drive snow from the highways. The headquarters shop was active late this past summer and early fall as men added new blades to a fan on a rotary, got pushplows into shape, and put the finishing touches to other pieces of equipment which needed maintenance work. This maintenance—the first step to be taken in the division's snow-removal program—now makes possible fast action on the part of all crew members and their equipment as soon as the snow begins to fly.

THE END

Folder Explains Features Of Rubber-Tire Tractors

■ A new folder describes the features of the 208-hp rubber-tire tractor built by LeTourneau-Westinghouse Co., Peoria, Ill. Using photos, diagrams, and charts, the folder shows how the Tournatractor's range of speeds cuts minutes from the work cycle. The literature also describes features which minimize required maintenance and repairs on the unit.

One section explains how electric motors located at points of action give the operator fast and accurate control.

To obtain Form 54-005-T write to the company, or use the Request Card at page 18. Circle No. 362.

Catalog on Motor Grader

■ The No. 660 Adams motor grader, powered by a 140-hp Cummins diesel engine, is described in a catalog just released by the manufacturer. The catalog presents information on the construction of this 28,000-pound grader and on its operating advantages.

Optional equipment illustrated includes a scarifier, bulldozer, elevating grader, V-type snowplows and snow wings, a rotary snowplow, and a rotary-type snow wing.

To obtain this literature write to the J. D. Adams Mfg. Co., Box 853, Indianapolis, Ind., or use the Request Card at page 18. Circle No. 350.

Application Data About Percussion Rock Drills

■ A booklet from Gardner-Denver Co. is concerned with deep-hole drilling with percussion rock drills from the equipment application viewpoint. This method can be used for vertical and horizontal ring drilling, pillar recovery, block caving, exploration and sampling, conduit drilling, demolition work, and deep-hole percussion drilling in quarries, open pit mines, and surface rock cuts.

The booklet also describes the complete line of Gardner-Denver coordinated equipment for deep-hole percussion drilling, including rock drills, drill mountings, ring seal shanks, sectional drill rods, and a new dual-pressure air compressor.

To obtain this literature write to the Gardner-Denver Co., S. Front St., Quincy, Ill., or use the Request Card at page 18. Circle No. 367.

Electric Impact Tool

■ A new rotary electric impact tool, with 25 per cent more power than earlier models, has been developed by Ingersoll-Rand, 11 Broadway, New York, N. Y. According to new literature, the Impactool was designed for work on modern high-compression and high-torque automotive engines. It is said to provide the mechanic with sufficient power to handle all but the largest nuts and bolts on cars and trucks.

Known as the Size 5U, the tool has a ½-inch drive and weighs only 6¼ pounds.

To obtain Form PL-5151 write to the company, or use the Request Card at page 18. Circle No. 388.

A new attachment consisting of a subsoiler and a guide device makes shallow installations of flexible pipe and cable without hand digging or machine trenching.

Wheel-Tractor Device Lays Pipe and Cable

■ A new attachment for Ferguson tractors installs flexible pipe and cable underground without requiring digging by hand or machine trenching. This tractor tool will put flexible piping, 1½-inch or smaller in diameter, up to 18 inches into the ground. Actually this pipe and cable layer is an agricultural subsoiler to which a guide tube and guide rings for the pipe or cable have been added.

To lay flexible pipe or cable, an exploratory subsoiling pass is first made with the tractor and subsoiler over the route of the projected line to clear away rocks, roots, or other obstructions. Then the length of pipe or cable is laid alongside the cut and threaded through the laying device.

As the tractor is driven forward, the subsoiling beam goes into the ground and the piping or cable slips through the guides, to be deposited at the bottom of the subsoil cut. According to the manufacturer, speeds as high as 300 fpm are practical.

No backfilling is necessary. After the piping or cable is laid, the slight ridge left is leveled by driving over it.

For further information write to Ferguson Division, Massey-Harris-Ferguson, Inc., 1721 Packard Ave., Racine, Wis., or use the Request Card at page 18. Circle No. 285.

Large Transport Body For Bulk Materials

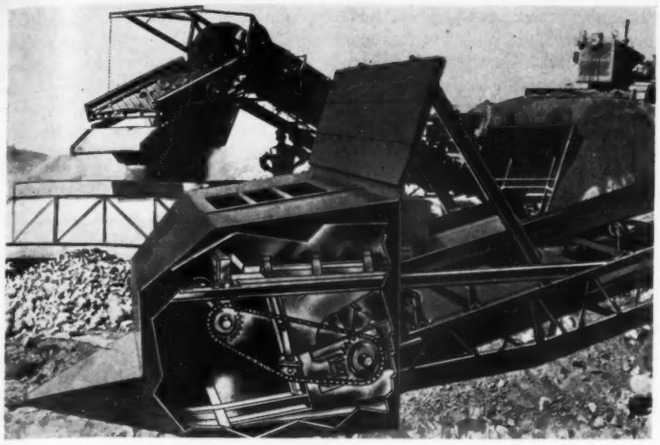
■ A new bulletin describes the large-volume Bulkmobile transport body manufactured by the Baughman Mfg. Co., Jerseyville, Ill. The literature covers such construction features as the all-hydraulic operation of the body conveyor and discharge accessories, the all-welded body, the compartmented interior, externally-controlled doors, and the roomy body hatches.

To obtain Bulletin A-399 write to the company, or use the Request Card at page 18. Circle No. 353.

Various Weight Indicators For Construction Use

■ A new catalog describes Martin-Decker heavy-duty weight and tension-indicating instruments. It illustrates such items as hook scales, tensiometers, crane-weight indicators, lift-truck scales, logweighers, load cells, check valves, and stroking diaphragms.

To obtain Bulletin M-15 write to Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif., or use the Request Card at page 18. Circle No. 378.



Cut-away view shows Kolman loading trap with reciprocating plate feeder inside. Because it is built as an integral part of the conveyor and trap, the feeder is completely portable.

Conveyor-Screen Plants Now Fully Portable With New Feeder-Trap Feature

■ A new feature now found on Kolman portable conveyor-screen plants is a reciprocating plate feeder built into the loading trap. This design provides a complete loading and screening plant that is entirely portable by making the plate feeder an integral part of the conveyor and trap.

Because the reciprocating plate feeder is completely contained within the steel loading trap, there is a constant positive flow of material despite intermittent methods of feeding. This design also protects the conveyor belt by minimizing wear.

The new Kolman conveyor-screen plants consist of a Model 101 heavy-duty conveyor with single, double, or triple-deck vibrating screens attached. The plants are recommended for scalping oversize, rejecting fines, screening and loading sand and gravel, screening ahead of crushers, making chips, and doing similar jobs.

Units are available in a wide range of sizes and with belt widths from 18 to 36 inches. Capacity of the 36-inch size is over 800 tons per hour.

For further information write to Kolman Mfg. Co., W. 12th St., Sioux Falls, S. Dak., or use the Request Card at page 18. Circle No. 347.

Long-Crawler Excavator

■ A new bulletin on the Model 255 ALC ¾-yard long-crawler P&H excavator is now available. The literature has a description and illustrations of the complete machine, as well as detailed information on the extra-long wide crawlers.

To obtain Bulletin No. X-161 write to Harnischfeger Corp., Small Excavator Division, 4609 W. National Ave., Milwaukee 46, Wis., or use the card at page 18. Circle No. 286.

Details on Advantages of Aluminum Bridge Railings

■ A book on aluminum bridge railings has been issued by the Reynolds Metals Co., and is available on request. Based upon experience with actual bridge-railing installations, the book includes a study of architectural considerations and complete design details; recommendations for joints, endings, and post settings; as well as surface treatment and insulation.

The design studies include a structural analysis of a typical railing as well as information for calculating deflection and impact values.

To obtain this book without charge write to Desk PR, Reynolds Metals Co., 2500 S. Third St., Louisville, Ky., or use the Request Card at page 18. Circle No. 352.

AVOID LEGAL PITFALLS

Oral Modification Of Written Contracts

THE PROBLEM: *A subcontract covering landscaping on a federal housing project did not specify when the work should be completed but contained a guaranty by the subcontractor of continued growth of shrubbery. When the construction boss insisted on planting by September 15, the subcontractor objected on the ground that it should be deferred until October when rain would promote the initial growth. But the subcontractor yielded to earlier planting on condition that the growth guaranty be abrogated. Could the general contractor repudiate this modified agreement on the ground that the original written contract could not be altered by an oral agreement?*

THE ANSWER: No. (Freeman v. Stanbern Construction Co., 106 Atl. 2d 50, decided by the Maryland Court of Appeals.)

The opinion is of general interest because it summarizes rules of law applied by the courts throughout the country, showing when an oral agreement can or cannot affect a written agreement covering the same subject-matter. The rules are to this effect: (1) The terms of a written contract cannot be altered or contradicted by proof of an oral agreement made before or when the written contract was made, unless it also be proved that through fraud or duress of the other party, or through mutual mistake, the writing does not state the true agreement. (2) If the writing is silent upon an important point and the written contract does not seem to have been intended to exclude it, proof of an oral agreement on that point is proper. (3) Generally, it may be shown that after a written contract was made, the parties orally agreed upon a modification of one or more of the terms of the contract. This is so even if the written contract specifies that it can be modified only by written agreement. (This rule is based upon the reasoning that if the original contract would have been valid though not in writing, a modification should not be required to be in writing. However, this assumes that there is no state statute requiring the original contract to be in writing.) (4) Likewise, where there is no statute requiring the original contract to be in writing and the parties discover that it does not accurately express their mutual intention, it is not legally necessary that their agreement as to the contract's interpretation be in writing. (5) In a case like that presented to the Maryland court, where differences arise between the parties, a compromise may be reached under an oral agreement.

However, as a practical matter, it is always desirable that any supplemental agreement be reduced to writing—not necessarily formal. This guards against dispute as to whether there was a modifying agreement or, if so, as to the terms of that agreement.

Unit Prices Covered Surface Restoration

THE PROBLEM: *A county contract called for improvement of a road by grading, paving, curbing, installing drainage structures and retaining walls at unit prices, and restoring the surface. Was the contractor entitled to pay for restoring the road surface where he constructed a sewer, despite the fact that the contract made general reference to certain general specifications of the city, which required contractors to restore street openings at their own expense?*

THE ANSWER: Yes. (S. A. Ruebel & Co. v. Morr, 120 N. E. 2d 605, decided by the Ohio Court of Appeals, Hamilton County.)

The court said that, because the county prepared the wording of the contract, any conflict between its specific provisions and the reference to general specifications should be resolved in favor of the contractor.

Statute Considered Void Because Discriminatory

THE PROBLEM: *A Kentucky statute provided that if any section of a state highway under construction should be opened before completion, the contractor could exempt himself from liability by posting at each end of the section a warning sign, "Road Under Construction; Travel at Your Own Risk." Was the statute unconstitutional as being unjustly discriminatory*

Edited by A. L. H. STREET
Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

against other road contractors?

THE ANSWER: Yes. (Crawford v. Calumet Paving Co., 117 N. E. 2d 368, decided by the Indiana Supreme Court.)

The court noted that the same exemption from liability was not given contractors repairing or resurfacing state highways, or constructing or repairing state highway bridges, county or township roads, or city streets.

Finding that the statute was unconstitutional, the court decided that it was not available as a defense for a contractor who was sued for injury to a motorist on a section of state highway that was under construction.

The Supreme Court cited several decisions of the highest courts of Connecticut, Massachusetts, and Wisconsin that were relied upon by the contractor's attorneys as sustaining the validity of the statute. But the court noted that in those cases no question of unconstitutionality had been raised or decided.

Employee Was Injured On Slippery Floor

THE PROBLEM: *A prime contractor permitted a gymnasium floor to be completed before carpentry work had been done overhead. The subcontractor's employee rested a ladder on the floor, although he was aware of its slippery condition. The ladder slipped, and the employee was injured. Was the prime contractor liable in damages?*

THE ANSWER: No. (Robert E. McKee, General Contractor, Inc., v. Patterson, 271 S. W. 2d 391, decided by the Texas Supreme Court.)

The court said that it had never been the law in Texas "that the necessity of performing his duties and of earning a livelihood was of such economic compulsion or constraint as to render involuntary the workman's choice of accepting or retaining employment in the face of known and appreciated dangers."

Debt Limit Made Contract Illegal

THE PROBLEM: *Construction of a proposed sewerage system for a Missouri municipality would have involved the incurring of a debt in excess of that permitted by law without authorization by a two-thirds vote of the electors. Was a contract employing an engineer to prepare plans and specifications for the project validated by the facts that there was then pending legislation authorizing federal aid for such projects and that the state legislature afterwards authorized financing of such projects by the issuance of bonds payable from the revenues of the projects?*

THE ANSWER: No. (Fulton v. City of Lockwood, 269 S. W. 2d 1, decided by the Missouri Supreme Court.)

The court said that the contract was void when made and was not rendered valid by subsequently enacted legislation.

Right to Site Delayed

THE PROBLEM: *A federal channel-improvement contract required the government to furnish the necessary lands, easements, and right-of-ways without cost to the contractor. The government, in turn, relied upon a local levee board's agreement to secure the necessary lands, easements, and right-of-ways without cost to the government and to indemnify the government against damages resulting from the construction. When only seven days were required to complete the job, two armed landowners stopped operations. The stoppage continued for 39½ days pending court proceedings to dispose of the landowners' claims. (1) Was the government liable to the contractor for resulting damages? (2) If so, was the levee district bound to reimburse the government?*

THE ANSWERS: (1) Yes. (2) Yes. (Delta Equipment & Construction Co. v. United States 113 Fed. Supp. 459, decided by the United States Court of Claims.)

Contractor Not Liable For Accidental Injury

THE PROBLEM: *A prime contractor sublet excavation of a ditch for a street sewer connection. If the subcontractor's employee negligently caused injury to a plumber working in the ditch, was the prime contractor liable?*

THE ANSWER: No. (Gilbilterra v. Rosemawr Homes, 108 Atl. 2d 295, decided by the New Jersey Superior Court, Appellate Division.)

(*Continued on next page*)

(Continued from preceding page)

The court applied the general rule of law that an owner or prime contractor is not liable to third parties for negligence of an independent contractor unless the work to be done by him is of such nature that it will be inherently dangerous unless carefully performed. The ditch did not constitute an inherently dangerous condition.

Subcontractors' Rights

THE PROBLEM: *When a subcontract on a government project is so worded that the prime contractor is not liable to the subcontractor for damages resulting from delays caused by the government, can the prime contractor in suing the government for delays collect damages for so much of the delays as affect the subcontractor only?*

THE ANSWER: No. (Continental Illinois National Bank & Trust Co. v. United States, 115 Fed. Supp. 892, decided by the United States Court of Claims.

Florida Liens

THE PROBLEM: *A materialman furnished materials to a house-building contractor but did not notify the owner that a lien would be claimed until the owner had paid most of the contract price to the contractor. Under Florida law, did the materialman lose the right to a lien except as to the money remaining due the contractor from the owner?*

THE ANSWER: Yes. (Beam v. Jerome Lumber & Supply Co., 74 So. 2d 537, decided by the Florida Supreme Court.)

Accepted Bid Was Contract

THE PROBLEM: *(1) Where a California school district called for bids to erect school buildings, did acceptance of a bid bind the bidder to construct the buildings on the specified terms without the necessity for a formal contract, there being no statute requiring such a contract? (2) Did the fact that the bidder was required to deposit a $25,000 check with the bid, as "liquidated damages" to secure performance of the contract, limit the amount of damages that the school district could collect, the amount bid being $1,377,700?*

THE ANSWERS: (1) Yes. (2) No, if greater actual damages could be proved. (Berkeley Unified School District v. James I. Barnes Construction Co., 112 Fed. Supp. 396, decided by the United States District Court, Northern District of California, Southern Division.)

(1) The decision rests upon the facts that the bid specified that the bidder agreed to do the work according to completed detailed plans and specifications; that no terms remained to be agreed upon; that there was no statute requiring a formal contract; and that the bidder agreed that he would sign a contract in the form attached to the bidding specifications.

The court cited numerous court decisions from various states to support this general rule of law: Generally, acceptance of a bid for public work constitutes a binding contract, in the absence of a statute or municipal charter provision requiring a formal contract, or where a call for bids is so worded as to indicate that no binding contract is intended to result from mere acceptance of a bid submitted.

The courts of California follow a rule that has been frequently declared by the appellate courts of other states—that once a bid on a municipal project has been opened, it cannot be withdrawn without the consent of the municipality.

(2) The check filed with the bid was not, as is usually the case, security for entry into a contract on acceptance of the bid, but was deposited as "liquidated damages" in case the contract was not performed. The court said that the $25,000 check would limit the school district's damages, if it was impossible or extremely difficult to prove the actual amount of damages suffered by the district. But, in line with what courts generally declare, the court decided that if, on trial of the case, it should appear that the actual damages sustained by the district were more or less than $25,000, the bidder's liability would be for the actual damages, and not $25,000. That is, if the damages exceeded $25,000, the bidder must forfeit the check and pay the excess amount of the damages. If the damages were less than $25,000, the bidder would be entitled to a corresponding refund.

Grader Turned Over

THE PROBLEM: *An experienced operator of heavy road-construction equipment was warned that a grader was top heavy and should not be used on slopes. He disregarded the warning and was killed when the grader turned over. Was his widow entitled to hold the employer liable for damages? (It is to be noted that this case did not involve a claim under a workmen's compensation act, where an employee's disregard of instructions does not necessarily prevent an allowance.)*

THE ANSWER: No. (Hunter Construction Co., appealing defendant, v. Watson, plaintiff, 274 Pac. 2d 374, decided by the Oklahoma Supreme Court.)

Three of the eight judges who passed on this case disagreed with the decision, which set aside a judgment in favor of the widow. The three dissenting judges thought that the employer should be held liable because the cab was not dismounted, which would have avoided the top-heavy condition. They regarded that omission as having more connection with the cause of the accident than did the employee's disregard of instructions.

Stronger lift arms are one of the improvements to be found on the Davis front-end tractor loader.

Improved Tractor Loader Has Stronger Lift Arms

■ An improved model of the Davis front-end tractor loader has been announced by Mid-Western Industries, Inc., 1009 S. West St., Wichita, Kans. New features include stronger lift arms of debossed box-type construction. Down pressure on the lift arms also increases the loader's usefulness in excavating and maintaining grades. A rubber mounting now minimizes the shock load on the front of the tractor, and shock slots transfer the thrust to the rear. The loader also has a centralized reservoir that provides a clean hydraulic system.

The Davis loader is offered in the Model 101 Series that fits 2 and 3-plow tractors and the Model 102 with twin dump cylinders for 3 and 4-plow tractors. Attachments available include a scarifier.

For further information write to the company, or use the Request Card at page 18. Circle 396.

New Series of Booklets Describes Welding Line

■ A new series of catalogs describes the entire line of Murex electrodes for arc welding, as well as rods and wire for gas, submerged arc, and inert arc welding. Specific catalogs cover electrodes for mild steel and low alloy, coil wire for submerged arc welding, stainless steel electrodes and bare wire, aluminum and phosphor bronze electrodes and bare wire, aluminum electrodes and bare wire, electrodes for cast iron, gas welding rods, and tungsten rods.

For further information write to Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y., or use the Request Card that is bound in at page 18. Circle No. 380.

Data on Aluminum Paint For Highway Bridges

■ A revised publication giving a suggested specification for ready-mixed aluminum paint for highway bridges is available from the Aluminum Co. of America. The literature also sets forth methods for testing the aluminum paint's composition, weight per gallon, drying time, viscosity, and moisture content.

To obtain this literature write to Aluminum Co. of America, 747 Alcoa Bldg., Pittsburgh 19, Pa., or use the card at page 18. Circle No. 383.

New Combination Unit Is Welder and Power Plant

■ A combination gas-driven ac welder and power plant has been announced by Marquette Mfg. Co., Inc., 307 E. Hennepin Ave., Minneapolis 13, Minn. Equipped with a specially designed Onan engine, the unit gives up to 200 amps of welding current at 100 per cent duty cycle. It also provides a power source of 4½ kw at 110 to 220 volts for operation of heavy-duty power tools or lighting circuits.

In addition to the improved arc stability provided by the unit's 100-cycle ac power, the Porto-Arc delivers a 1,000-watt dc power source, even while welding. The welding equipment is also offered without the power plant.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 358.

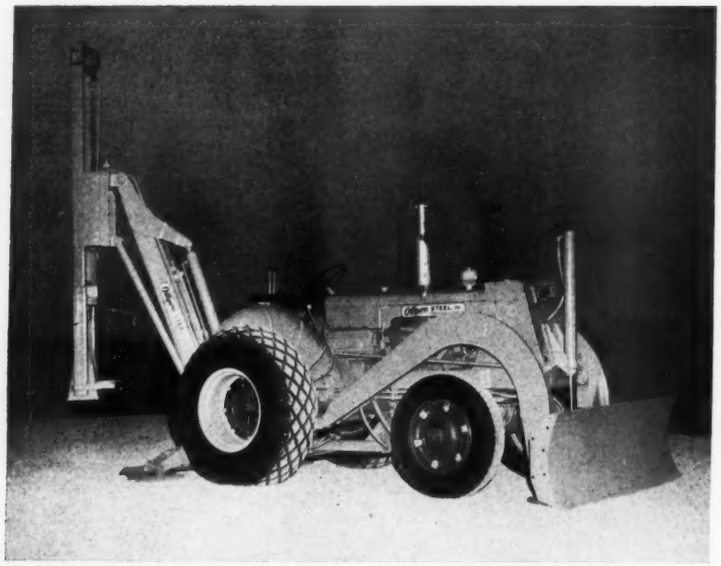
Fluid Couplings Aid Engine Performance

■ A new bulletin gives complete installation and performance data on Twin Disc fluid couplings. The couplings can be used on equipment powered by any type of electric motor or internal-combustion engine from ¾ to 850 horsepower.

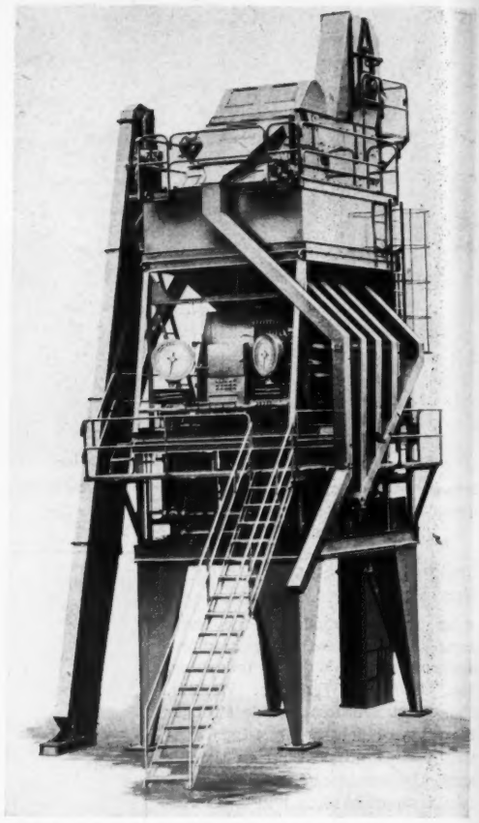
The literature shows the complete Twin Disc fluid-coupling line and illustrates all the installation hook-ups provided by the broad variety of fluid couplings offered.

To obtain Bulletin No. 144-D write to Twin Disc Clutch Co., Dept. DS, Racine, Wis., or use the Request Card that is bound in at page 18. Circle No. 360.

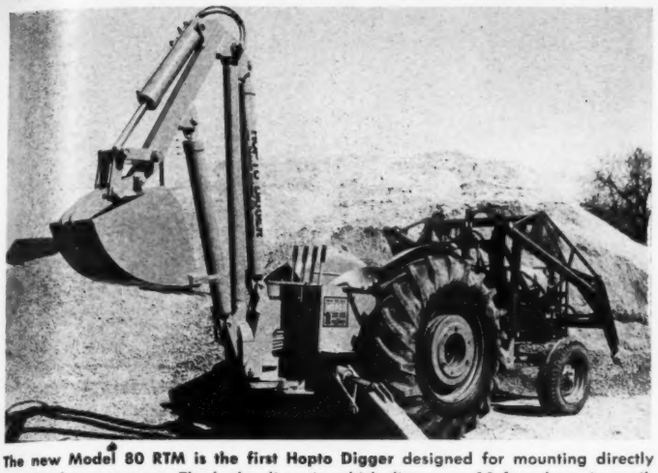
PRODUCT PARADE



A versatile new self-propelled machine, the Hydra-Way, has been introduced by Ottawa Steel, Inc. With several available front and rear-end attachments that can be mounted in a number of combinations, the Hydra-Way is a multipurpose machine. Rear-end attachments for the unit are a tower compactor, concrete breaker, or asphalt cutter; a heavy-duty backhoe; and a 42-inch-wide backfill blade. For the front-end of the machine, Ottawa offers a straight or angle bulldozer; a counterweight; a bucket-loader; a crane hook; an extension boom; a backfill blade; and a platform. The tower compactor is the Ottawa Hydra-Hammer tower and its operating mechanism. The backhoe is a heavy-duty unit that digs up to 11 feet deep. All of the interchangeable attachments are operated by one hydraulic system, with two levers accomplishing all the digging operations. The maximum road speed of the self-propelled machine is 25 mph. With this wide variety of attachments, the Hydra-Way can do a considerable number of operations. It can break concrete, cut asphalt, dig holes and trenches, load trucks, remove snow, bulldoze and angledoze, backfill, and compact backfill. It can dig and carry one yard of earth, then turn around and compact it on the spot. The rear-mounted Hydra-Hammer tower compacts road material or breaks a large area of concrete from one standing position. It compacts to 100 per cent Proctor in increments of 4 feet. The angle bulldozer, mounted on heavy-duty thrust arms, angles 30 degrees to the right or left. The blade moves 30 inches above the ground to 14 inches below ground. It is 7 feet wide and may be increased to an 8 or 9-foot width with extensions. Write to Ottawa Steel, Inc., Ottawa, Kans., or circle 246 on card at page 18.

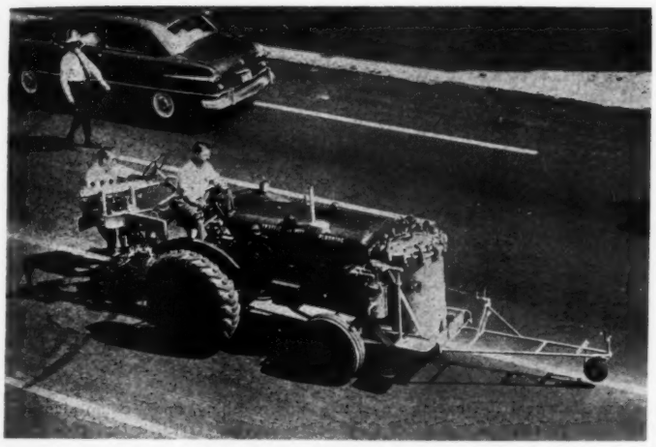


The first model of a new series of Barber-Greene automatic batch plants has a number of new control features for securing maximum tonnage capacity, operating ease, and flexibility. Time-saving features begin with the weighing operation, as the Model 894 weighs all sizes of aggregate, including the mineral filler, simultaneously. Also speeding production is a new type of fast-coating pugmill. With a special control feature that has added operating flexibility, the plants may be preset for all-day production of the same mix in repetitive cycles, then instantly switched for a new mix. To get back to the original mix cycle, the operator resets one valve. An important advantage is that the chance for human error has been reduced substantially. Whether the operator weighs all sizes simultaneously or uses the individual bin valves to weigh each size separately, he is working with preset proportions. An added feature that facilitates inspection, is the automatic extraction of a true cross-sectional sample of the aggregate in each bin as part of the regular operating cycle. Write to Barber-Greene Co., Aurora, Ill., or circle 245 on card at page 18.



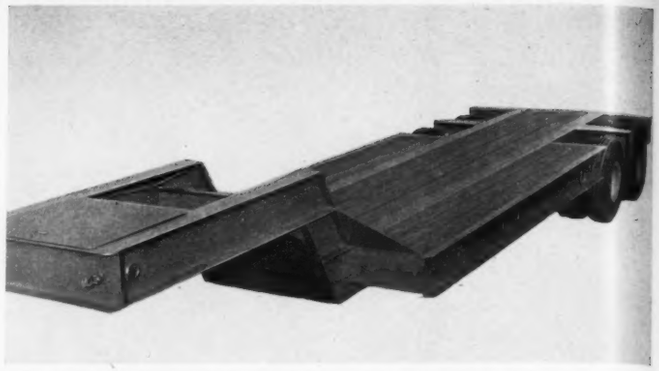
The new Model 80 RTM is the first Hopto Digger designed for mounting directly on wheel-type tractors. The hydraulic unit, which digs up to 10 feet deep, is available with from 8 to 36-inch-wide buckets in capacities up to ¼ yard. A full 90-degree swing to either side and built-in individually-controlled hydraulic outriggers are features. The Model 80 RTM mounts on the Minneapolis-Moline RTI, the Fordson Major Diesel, the Oliver 77 Industrial, the International Harvester Super C, the Power Horse 40, the John Deere Model 60, and other wheel tractors. Write to Badger Machine Co., Winona, Minn., or circle 249 on card at page 18.

A single piece of equipment that can handle a large variety of small to medium-size earthmoving jobs is the 4-in-1 version of the Drott Skid-Shovel. Available for either the International TD-6 or TD-9 crawler tractors, this shovel converts into a bullclam shovel (illustrated), bulldozer, Skid-Shovel, or clamshell through a simple selector lever. The change of function can be made even while the tractor is moving. A feature of Skid-Shovels, including the 4-in-1, are skid shoes that transmit digging force into the ground rather than into the tractor. Write to International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., or circle 248 on card at page 18.



One of the many uses for the Schramm Pneumatractor is highway-line marking. The Kelly-Creswell striping machine, working with the wheel-mounted Schramm compressor, does the job at the rate of 2 to 7 miles per hour. Two men operate the combination unit. The striping equipment removes quickly to free the Pneumatractor for other uses. These include front-end loader, backhoe, sweeper, snowplow, 8-foot boom, backfill blade, platform scaffold, air-feed attachment, and a variety of tools. For information on the striping equipment write to Kelly-Creswell Co., Xenia, Ohio, or circle 247 on card at page 18.

Swinging its unique boom 180 degrees, the Pettibone Speed Swing Loader discharges its load to the left or right as well as in front from a single digging and loading position. The Speed Swing is offered in ¾ and 1-cubic-yard models with buckets that have a 30-degree tilt-up. The unit is available with 2 or 4-wheel drive and optional four-wheel steer. Torque-converter transmission allows inch-by-inch crowding without gear shifting. Accessory attachments include a backfiller blade, 4-cubic-yard snow bucket, a fork, and a tote hook. Write to Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill., or circle 250 on card at page 18.

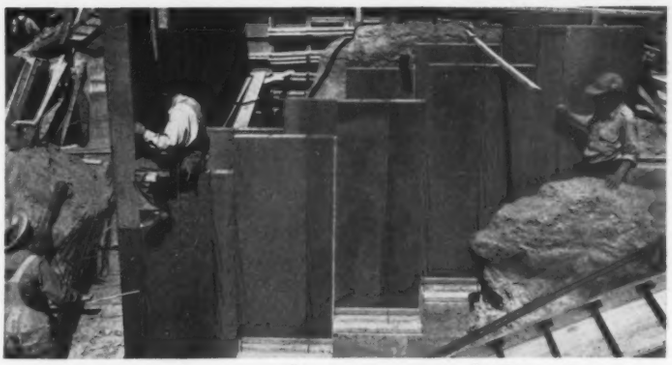


This new Dorsey low-bed trailer is 2,400 pounds lighter than older models of the same capacity. The new flat deck offered in place of the gooseneck is stronger and provides extra room for loading gear. High-tensile instead of mild steel was used in the construction of the trailer to increase strength while cutting weight. The Series HTS includes 15 to 35-ton models. Stub axles of the new series are mounted in tandem on walking beams and give maximum legal payloads. Write to Dorsey Trailers, Elba, Ala., or circle 209 on card at page 18.

The new Universal TS-Traveler gravel screening, crushing, and loading plant is a completely redesigned version of the original Traveler which it replaces. It consists of a 1½-yard-shovel loading hopper with trap grate, reciprocating 19-inch plate feeder, 2 × 4-foot inclined gyrating screen, a 1024 jaw crusher, and 24-inch front-delivery conveyor. The operator's platform and the power unit have been rearranged for greater convenience. The new compact plant has been designed for moderate production requirements, the manufacturer advises. For further information write to Universal Engineering Corp., 620 C Ave. N. W., Cedar Rapids, Iowa, or circle 211 on card at page 18.

Operating hydraulically off the truck engine, a Holmes-Owen front-end loader makes a one-man operation of scooping up, loading, hauling, and dumping dirt and other debris. The lifting arms hoist the load up and over the truck cab and into the dump body. The machine shown is being used by the Lone Star Gas Co., Fort Worth, for cleaning up rubbish, filling holes made during repair work, and for general utility chores. Write to Hobbs Mfg. Co., 609-623 N. Main St., Fort Worth 1, Texas, or circle 212 on card at page 18.

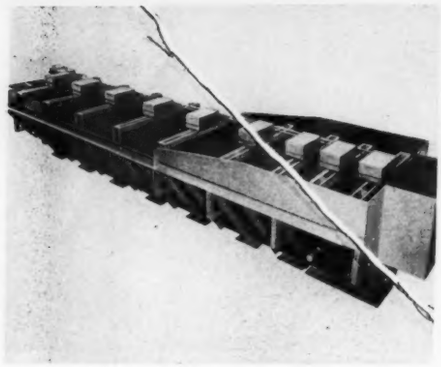
This new Tennant machine removes painted traffic lines in one operation. Powered by a 6-hp gasoline engine, the machine reportedly eliminates all need for burning or hand scraping. Using a spinning cutter head fitted with scores of heat-treated steel cutters, the unit shaves off paint from center lines, crosswalks, parking lanes, stop lines, and meter zones. It can be used on concrete or asphalt surfaces and does not require water or chemicals. One man handles the self-propelled machine by guiding it over the paint line at walking speed. Write to G. H. Tennant Co., 2534 N. Second St., Minneapolis 11, Minn., or circle 231 on card at page 18.



Symons Forms for Stepped Footings

The construction of stepped footings, ordinarily an expensive method of forming, was handled at no extra expense, on the administration building at the Sandia (N.M.) Air Force Base, by the use of Symons Forms.

Symons Forms are adaptable to commercial, industrial, institutional and public works construction jobs. Send in your request for our Catalog F-10 which gives complete details on the Symons Forming System. Symons Clamp & Mfg. Co., 4251 Diversey Avenue, Dept. B-5, Chicago 30, Illinois.

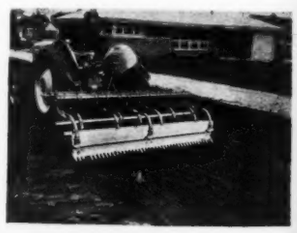


Eagle water scalping tanks can now be equipped with new power-operated bleeder valves to control proper depth of settled sand. There is no build-up of sand at any one bleeder valve on the bottom of the tank. Write to The Eagle Iron Works, 159 Holcomb Ave., Des Moines, Iowa, or circle 221 on card that is bound in at page 18.

This forage harvester is one of a number of New Holland farm machines that have found good use in road construction and maintenance. The machine is especially useful for spreading mulch on highway embankments or for spreading chopped straw on fresh concrete. Write to New Holland Machine Co., New Holland, Pa., or circle 203 on card at page 18.

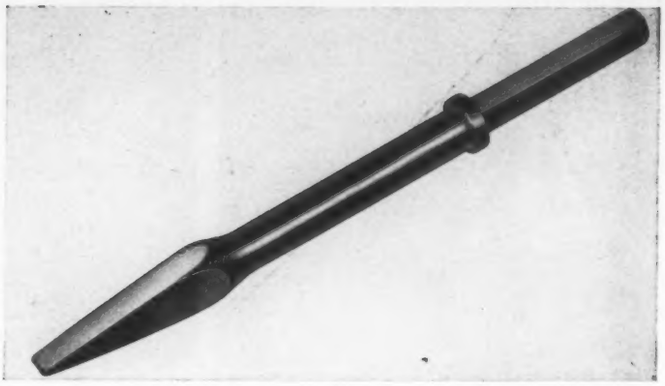
Hypressure Jenny Series 1800 steam cleaners feature 180-gph steam-cleaning capacity for removing heavy grease and dirt from equipment and parts. Two of the models are available with fingertip control of flushing and rinsing capacity up to 480 gph. Write to Homestead Valve Mfg. Co., Coraopolis, Pa., or circle 223 on card at page 18.

A new Upson-Walton Max-Lift crane-hook block features unusually short length that permits higher lifting limits on mobile cranes. Detachable cast-iron cheek weights and drop-forged heat-treated steel hooks are features. Bolt and pin ends are recessed to prevent snagging. Write to Upson-Walton Co., 12500 Elmwood Ave., Cleveland 11, Ohio, or circle 228 on card at page 18.



The Roseman tiller-rake scarifies and spreads cinders, stone, and asphalt in road building. It fits Ford, Ferguson, and other tractors having 3-point hydraulic-lift systems. Write to Roseman Tractor Equipment Co., Evanston, Ill., or circle 227 on card at page 18.

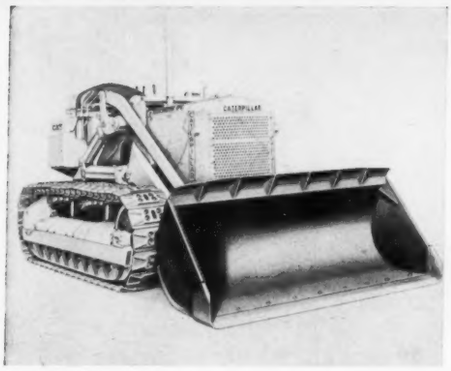
The difficult job of removing the master pins of crawler-tractor tracks has been made easier and faster with the introduction of the new OTC hydraulic track master-pin removing and installing set. With power provided by the Owatonna 50-ton Power-Twin center-hole ram, the tool can be used on all Allis-Chalmers and International tractor models. The illustration above shows the tool in operation on the track of an HD-20 Allis-Chalmers tractor. For further information write to Owatonna Tool Co., 381 N. Cedar St., Owatonna, Minn., or circle 262 on card that is bound in at page 18.



The new Vulcan Superkut concrete-breaking chisel works with a unique wedging action said to break concrete faster, easier, and in larger pieces than usual. Forged from high-grade electric furnace steel and hardened to rigid specifications the Superkut chisel is designed to wear longer and cut resharpening time to a minimum. The manufacturer reports that the new tool, when used on hard concrete, stays sharp 8 to 10 times longer than conventional moil points. The tool will cut through heavy mesh and reinforcing rods without fouling or jamming. It can be used also for breaking up asphalt, brick, or cobblestone pavement. In addition to the newly announced Superkut concrete chisel, Vulcan Tool also manufacturers a complete line of rock drilling, clay digging, and other pavement breaking tools. Write to Vulcan Tool Mfg. Co., 41 Liberty St., Quincy 69, Mass., or circle 263 on card at page 18.

This portable power generator weighing 210 pounds is a recent addition to the Hamco line of electric power units. The Model M-350-D is rated at 3,500 watts ac; 30.4 amps at 115 volts ac, and 15.2 amps at 230 volts ac. Voltage regulation is plus or minus 5 percent. Power for the portable unit is supplied by an 8-hp Briggs & Stratton 4-cycle air-cooled engine. Write to Hamden Machine Products, 44 Kendall St., New Haven, Conn., or circle 264 on card at page 18.

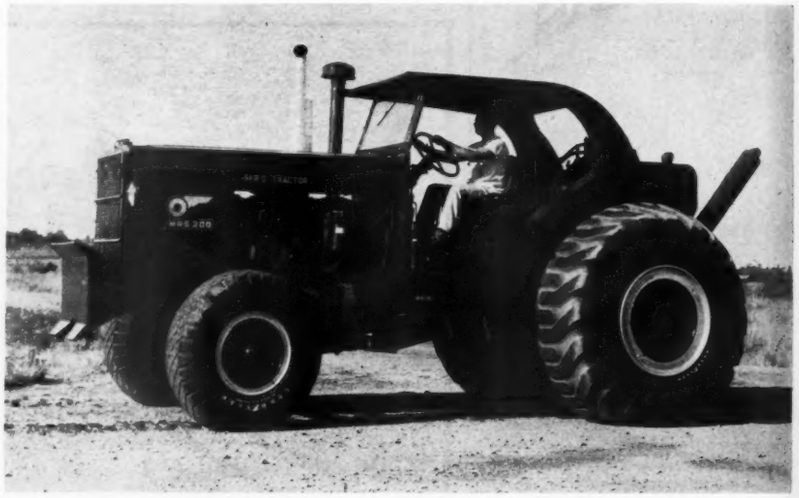
Stud welding has been made simpler by the new Model NS-9 stud-welding gun introduced by the Nelson Stud Welding Division of Gregory Industries. Getting an accurate stud alignment on a piece of work has been simplified by the elimination of the side cable loop required on earlier models. In addition, electrical connections have been reduced from 3 to 1 in the interest of increased operating efficiency. Write to Nelson Stud Welding Division, Gregory Industries, 2715 Toledo Ave., Lorain, Ohio, or circle 265 on card at page 18.



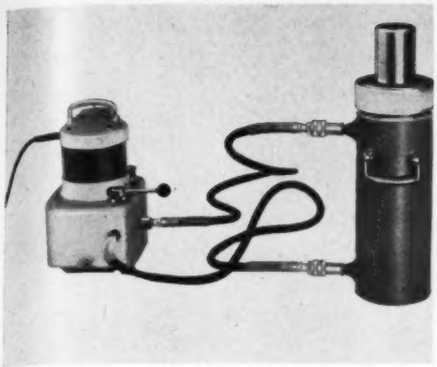
The bucket capacity of the Traxcavator No. 6 shovel has been increased from 2 to 2¼ cubic yards. The engine in the new No. 6 now delivers 100 horsepower at the flywheel, and the machine travels at a 30 per cent higher speed, going as fast as 7.4 mph. Write to Caterpillar Tractor Co., Peoria, Ill., or circle 201 on card at page 18.

Lima power shovels and cranes in the 22 to 50-ton class are now available with Lima-designed-and-produced one and two-engine carriers. Lima carriers were placed on the market some months ago and are now in full production. Write to Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio, or circle 205 on card at page 18.

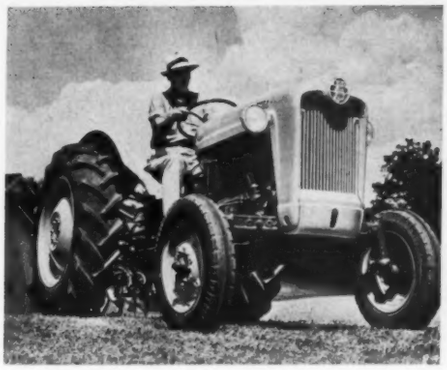
The Berkeley ConSERVall automatically welds or applies an overlay on any part requiring a horizontal pass. With the addition of a power-driven variable-rotation-speed positioner, it will weld or resurface circular units such as rollers, idlers, sheaves, and wheels. Write to Penn Tool & Machine Co., Danville, Ill., or circle 206 on card at page 18.



A new 335-hp wheel tractor has been announced by the M-R-S Mfg. Co. Designed to meet production problems created by multi-million-yard grading jobs, the M-R-S Model 220 has greater capacity, faster useable speeds, and more maneuverability than earlier models. The new tractor has been engineered to power scrapers up to 30-cubic-yards-struck capacity pusher-loaded. It will handle 18-yard-struck self-loading scrapers. The new 19.5-ton prime mover has 10 speeds forward ranging up to 35.16 miles per hour. A special 4-wheel design, easy power steering, and convenient controls are features enabling the operator to get the best performance from the tractor. Equipped with the M-R-S hydraulic weight-transfer device, the new tractor is reported to be capable of producing as high as 46,956 pounds of drawbar effort. The manufacturer emphasizes that this tractive ability means greater assistance to the push tractor than usual in getting heaping payloads with larger scrapers. A further feature of the machine is its versatility. Since the Model 200 is not permanently attached to the scraper, it can be unhooked quickly and its power put to work drawing large compaction rollers, construction rippers, machinery trailers, and pushing scrapers. Write to M-R-S Mfg. Co., Jackson, Miss., or circle 202 on card at page 18.



New 60-ton Re-Mo-Trol hydraulic jack and puller has a separate motor-powered pumping unit. The jack's hydraulic ram can be both raised and lowered by power to permit faster retraction and easier ram positioning. Travel is 10 inches. Write to Templeton, Kenly & Co., 2525 Gardner Road, Broadview, Ill., or circle 207 on card at page 18.



Ford's new 800 series includes full three-plow tractors offering 30 per cent greater power than earlier models and 5-speed transmissions. Shown is the Model 860. Ford has also announced another power series, the 600, with three models. Write to Tractor & Implement Division, Ford Motor Co., Birmingham, Mich., or circle 208 on card at page 18.

The new Balderson Model BA16X inside-mounted angling bulldozer for the Caterpillar D6 tractor attaches to the engine frame. With this type of mounting, the tracks are free to move up and down over rough terrain without putting any twisting strain on the main frame of the dozer. Write to Balderson, Inc., Wamego, Kans., or circle 222 on card at page 18.

Its wide range of auxiliary equipment and its maneuverability are the chief features of the Econmobile loader. The unit has a turning radius of 14 feet and, equipped with a Minneapolis-Moline RTI power unit, the hydraulic loader has a ground speed of 2.4 to 12.6 mph. The Econmobile can reach up as high as 22 feet with an auxiliary hydraulic tower. In the application shown above, the machine is equipped with pallet forks to lift stacks of lumber from the ground to roof beams. The Econmobile can also be equipped with an aggregate bucket to load concrete bins for job-mixed concrete. With a ½-yard cement bucket, the unit can be used to pour concrete walls. The Econmobile can also place light structural steel with a chain boom available for the unit. Other attachments include a dozer blade, a clean-up fork, a material bucket, and a work platform. Write to American Road Equipment Co., 4302 N. 28th St., Omaha, Nebr., or circle 204 on card at page 18.

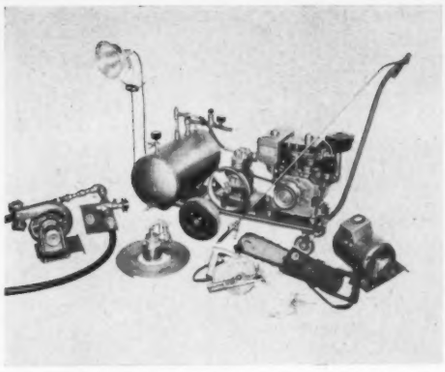
Two main features of the new Model T-10-A Traveloader are a torque-converter drive and springing of all four wheels. The side-loading unit handles long loads like a straddle truck, stacks materials like a fork truck, and delivers like a highway truck. Write to Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, Ohio, or circle 213 on card at page 18.

The largest unit of the Ditch-Witch line of small self-powered trenchers is the Model E. This unit features a variable-torque hydraulic drive operating independently from the bucket line to regulate the crowd of the digging chain. Write to the Charles Machine Works, 636 B St., Perry, Okla., or circle 214 on card at page 18.

The new Stow Roto-Trowel features a stationary guard ring in place of the conventional rotating ring to allow the operator to work right up to walls. The Model G34 illustrated has a 34-inch blade diameter and 2-hp gasoline engine. Write to Stow Mfg. Co., 192 Shear St., Binghamton, N. Y., or circle 215 on card at page 18.

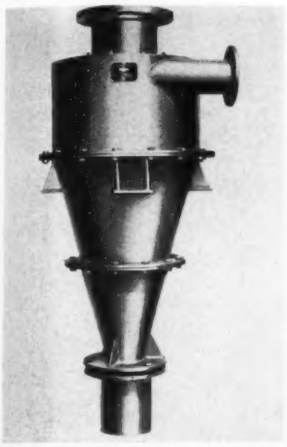
Master Vibrator's new lightweight generator can be carried by one man, yet supplies 1,500 watts. This is enough to operate small tools, floodlights, and electric pumps. A 3-hp gasoline engine runs the generator. Weight of dc and ac units is 97 and 107 pounds, respectively. Write to Master Vibrator Co. 262 Stanley Ave., Dayton, Ohio, or circle 219 on card at page 18.

A new hopper-type asphalt and aggregate spreader hooks to any standard dump truck without the use of attachments. The spreader is designed for laying an 8-foot spread, but the width of spread can be extended to 10 feet by a simple adjustment. Write to Good Roads Machinery Corp., Minerva, Ohio, or circle 217 on card at page 18.



The Model 60 Power-Slave comes equipped with interchangeable generator, air compressor and tank, pump, and spray boom, all powered by a 6-hp engine. The generator develops 2,500 watts of 115-volt ac power. Write to Master Mechanic Mfg. Co., Burlington, Wis., or circle 216 on card that is bound in at page 18.

The lightweight Clement hydraulic-lift trailer for hauling sand, gravel, and aggregate dumps by a unique operating principle. By locking the wheels and telescoping the lift arms, driver draws trailer forward into dump position. Write to Clement-Braswell, Inc., 505 First National Bank Bldg., Shreveport, La., or circle 234 on card at page 18.

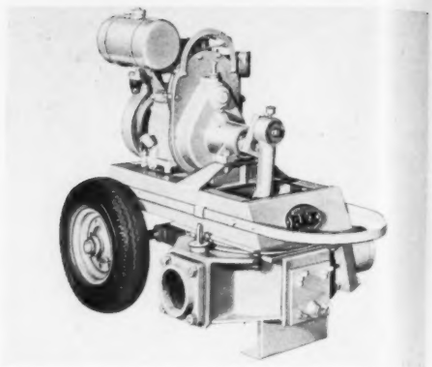


DorrClone equipment for recovering and classifying fine sand in aggregate production is now marketed by Smith Engineering Works under a license from the Dorr Co., Stamford, Conn. The 24-inch Telsmith Sand DorrClone recovers sand ranging in size from minus-30 to 200 mesh. Write to Smith Engineering Works, Box 723, Milwaukee, Wis., or circle 220 on card at page 18.

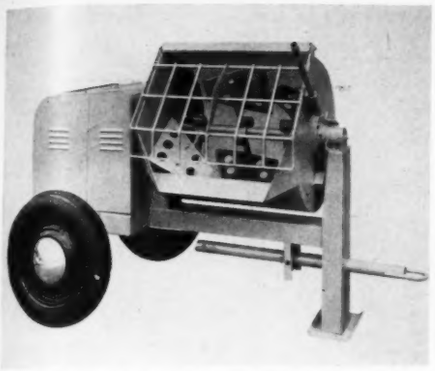
Oliver "OC-12" with hydraulic 1-yd. loader. This model has the long track frame for added stability. Loader has exceptional bucket rotation and 10' 4" loading height.

With traction in all wheels, Marmon-Herrington all-wheel-drive Fords go cross-country to construction sites which ordinary 4 × 2 trucks cannot reach. Illustrated is a Model M906 with a 6½-yard concrete mixer. Write to Marmon-Herrington Co., Inc., 1511 W. Washington St., Indianapolis, Ind., or circle 233 on card at page 18.

New tungsten-carbide diamond segmented blades were used to cut ¼-inch-wide contraction joints in 10-foot strips of green concrete to a depth of 2½ inches. New blades maintained required ¼-inch-wide cut for the life of the blade. Write to Consolidated Diamond Tool Corp., 320 Yonkers Ave., Yonkers 2, N. Y., or circle 218 on card at page 18.



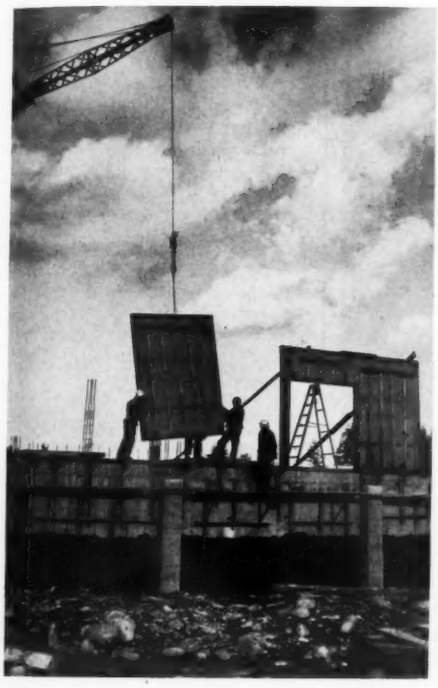
A new Rex 4-inch closed-diaphragm pump is designed for fluids that cannot be handled effectively with a centrifugal pump because of high solids content. A straight-line-flow feature helps to keep intake and discharge valves flushed and free of debris. Write to Chain Belt Co., Milwaukee 1, Wis., or circle 235 on card at page 18.



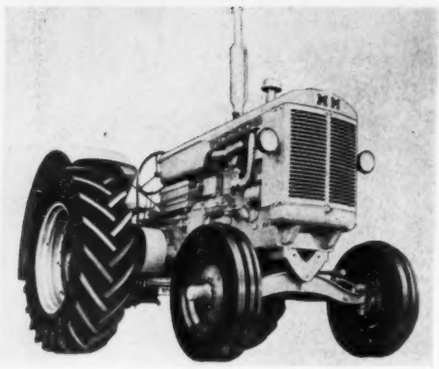
Western Duty plaster and mortar mixer, an 8-cubic-foot model, is run by either gasoline or electric power. The mixing drum is 29 inches in diameter and 32 inches long. Adjustable hoe-type blades provide end-to-end mixing. Write to Western Welding & Mfg. Corp., 2025 W. Clybourn St., Milwaukee 3, Wis., or circle 236 on card at page 18.

The body understructure of the Model TEC 4SF-SW tandem-axle dump semitrailer withstands heavy impact when being loaded by a shovel. The 20-foot-long dump body has a 20-cubic-yard capacity for use in excavating service. Write to Truck Engineering Corp., 1285 W. 70th St., Cleveland 2, Ohio, or circle 237 on card at page 18.

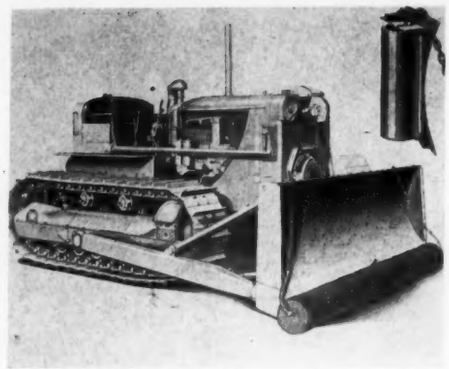
A new method of waterproofing structures and soils injects chemicals, including new plastics, that penetrate into voids and then solidify through catalysts. The method can be used on cellars, foundations, bridges, tunnels, cofferdams, and dams. Write to Penetryn Systems, Inc., Box 5052, Albany 5, N. Y., or circle 238 on card at page 18.



Plyglaze re-usable concrete form panels combine the strength and workability of plywood with a hard, glossy-smooth, fused resin-fiber overlay. This tough densified surface forms a smooth concrete with no trace of grain pattern or other flaws. Plygaze is exterior-grade plywood with waterproof glue. It comes in standard plywood sizes and thicknesses. A feature of the Plyglaze forms is that they can be used repeatedly. According to reports, up to 203 re-uses have been recorded, and the average is between 40 and 80. For maximum re-use, panelized form sections with standardized tie-hole placement should be used. Write to St. Paul & Tacoma Lumber Co., Tacoma 2, Wash., or circle 210 on card at page 18.



One of the most powerful Minneapolis-Moline tractors ever built is the new 5-plow Model GB. Power ratings are 74 belt horsepower and 64 drawbar horsepower for an LP-gas model and 70 belt horsepower and 61 drawbar hp for the gasoline model. Write to Minneapolis-Moline Co., Box 1050, Minneapolis 1, Minn., or circle 258 on card at page 18.



Little Giant grapple chains can be used with bulldozers to lift items such as buried posts, poles, pipe, and piling. With enough chain left out to grapple the load and with the slack pulled up, the bulldozer operator picks up the load by raising the blade. Write to Little Giant Products, Inc., 1530 N. Adams St., Peoria, Ill., or circle 259 on card at page 18.

New Model WF3 Wagner loader for the Oliver Super 55 tractor uses the Wagner independent live-power system that has a third cylinder to control attachments. Featuring a 2,000-pound breakaway rating, the unit handles live loads up to 1,000 pounds. Write to Wagner Iron Works, 1905 S. First St., Milwaukee 1, Wis., or circle 260 on card at page 18.

Compact new hydraulic Tulsa winch for trucks and other vehicles can be installed in almost any location and controlled remotely with the power source located at a distance from the winch. This eliminates rigid drive shafts, pillow-block bearings, sprockets, chain, and levers. Write to Tulsa Winch, 815 E. First St., Tulsa, Okla., or circle 261 on card at page 18.

Seamless flexible metal hose made in bronze, steel, stainless steel, and Monel is strong, light, and absolutely tight against water, oil, gas, and air. Atlantic metal hose is made from a single piece of seamless rigid tubing with corrugations. Write to Atlantic Metal Hose Co., Inc., 308 Dyckman St., New York 34, N. Y., or circle 244 on card at page 18.

Steel Flooring Replaces Worn Planks on Rural Connecticut Bridge

When the plank flooring of this bridge near Seymour, Conn., needed replacing, the bridge was stripped to the stringers, repairs were made, and a new deck of Bethlehem Formed Steel Bridge Flooring laid down. Result: a strong, smooth, rattle-proof bridge floor, requiring little or no maintenance.

Rolling the surfacing material which covers the steel bridge floor.

Bethlehem Formed Steel Bridge Floor was easy to install. First, the worn planking was removed, then the Bridge Flooring was carried from the stockpile, where it nested compactly in small piles, to the bridge. After proper positioning, the 2-ft-wide corrugated steel plates were welded to the stringers, and adjacent plates welded together. In the case of wooden stringers, the steel floor is easily attached with lag screws and washers.

After a surfacing material was applied, the new bridge floor met all strength specifications of the American Association of State Highway Officials' standard specifications for highway bridges.

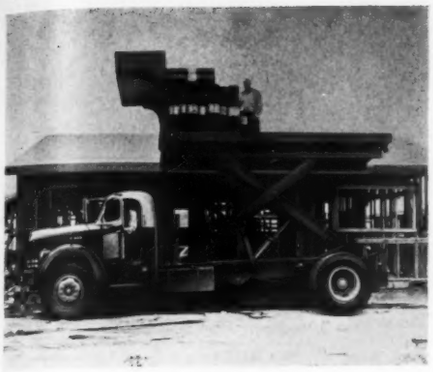
For complete information on Bethlehem Formed Steel Bridge Flooring write or phone the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation.

BETHLEHEM STEEL

BETHLEHEM STEEL



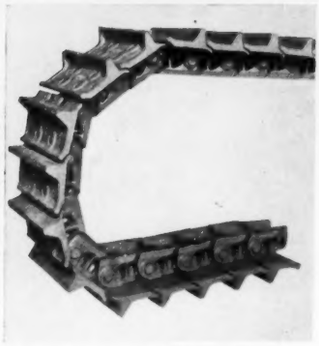
A special body and scissors hoist elevates workmen and materials (in this case, roofing) right up to working level. The lifting unit has a 14-foot steel platform mounted on a Model F50L Reo truck, and lifts up to 16,000 pounds 11 feet high. Write to Reo Motors, Inc., Lansing 20, Mich., or circle 224 on card that is bound in at page 18.

This is a typical interior of the Pontiac trailer homes. Available in standard sizes 26 to 51 feet long, the trailers sleep 4 to 8 people. Standard models contain complete kitchens, bathrooms, and furniture. Contractors can buy a shell to equip as an office trailer. Write to Pontiac Coach Co., Drayton Plains, Mich., or circle 225 on card at page 18.

An elevating grader attachment available for Warco 4D-85 and 4D-115 motor graders handles 1,000 to 1,800 cubic yards per hour while casting. It has a 30-inch adjustable disk that feeds onto a 42-inch-wide conveyor belt. The standard 16-foot carrier extends to 19 or 22 feet. Write to W. A. Riddell Corp., Bucyrus, Ohio, or circle 226 on card at page 18.

The Forney Model QC-100-S is designed to test 6 × 12-inch cylinders and cast beams up to 8 × 8 × 48 inches. Accessories can be interchanged quickly. The upper spherical seat for cylinders and the upper section of the third point loading apparatus for beams are held in place by a single bolt. Write to Forney's Inc., P. O. Box 310, New Castle, Pa., or circle 229 on card at page 18.

A newly designed pocket and tooth for trencher buckets has a smooth radius in the pocket opening to make a positive taper fit with the tooth. Write to Jetco, Inc., 1100 Westminster Ave., Alhambra, Calif., or circle 230 on card at page 18.

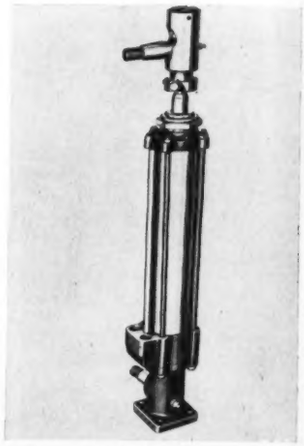


Made from special alloyed manganese steels for high resistance to abrasion, wear, and shock, Kensington tracks have grousers that are cast with built-up sections at vulnerable points. Write to Kensington Steel Co., 507 Kensington Ave., Chicago 28, Ill., or circle 239 on card at page 18.

Fleetliner hose service kits provide on-the-spot replacement of gas, oil, and diesel fuel lines on trucks and diesel engines. Each kit contains 25 feet of H-9 hose, couplings, and adaptors. Write to the Weatherhead Co., 300 E. 131st St., Cleveland 8, Ohio, or circle 240 on card at page 18.

The Lowell Red Ratchet wrench is a reversible wrench that consists of two hardened steel pawls backed up by solid stock of the handle. Long-reach models are available for extra leverage. Write to Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass., or circle 241 on card at page 18.

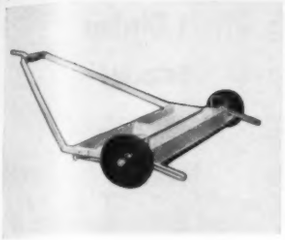
This rolling work tower equipped with a set of the new inside flat stairs was assembled from Safway tubular steel scaffolding. Towers of almost any desired size can be built. Write to Safway Steel Products, Inc., 6234 W. State St., Milwaukee 13, Wis., or circle 242 on card at page 18.



This compact hydraulic power-steering booster was designed for wide application in construction machinery and trucks. Its compactness is the result of a new Servo control-valve design and relocated hydraulic connections. The booster is available with or without a relief valve. Write to Vickers, Inc., 1400 Oakman Blvd., Detroit 32, Mich., or circle 243 on card at page 18.

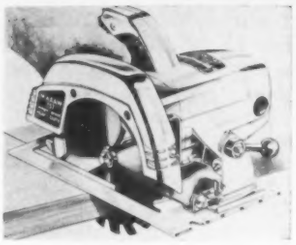
The Whiteman Model GW heavy-duty concrete vibrator is available with a choice of either a wheelbarrow or a swivel base. Power for the vibrator, which operates at 9,000 vibrations per minute, is supplied by a Wisconsin gasoline engine. Vibrator heads for the unit are available in sizes ranging from 1¾ to 3 inches in diameter and 11 to 17 inches in length. Core and casing is available in lengths from 10 to 30 feet.

Other Whiteman products for the construction industry include rotary power trowels, the Power Buggy self-propelled cart, and portable concrete-screeding machines. For further information write to Whiteman Mfg. Co., 3249 Casitas Ave., Los Angeles 39, Calif., or circle 251 on card at page 18.



This is the Cesco combination road and manual magnetic sweeper which can be either pushed manually or towed behind a vehicle. With the wheels removed, the sweeper attaches to a lift truck by built-in carrier-hangers. Two models are available offering effective sweeper widths ranging from 2 to 5 feet. Write to Cesco, Div. A84, Santa Rosa, Calif., or circle 252 on card at page 18.

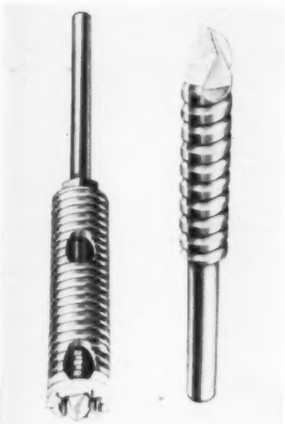
A new Cummins Maxaw, the Model 757, has been announced by the John Oster Mfg. Co. Depth of cut of the 10¾-pound saw is 1⅞ inches at 45 degrees and 2⅛ inches at 90 degrees. The Model 757 has the Maxaw Magic Pivot principle that permits the deep cut at the 45-degree angle. Write to the John Oster Mfg. Co., 5055 N. Lydell Ave., Milwaukee 17, Wis., or circle 254 on card at page 18.



Latest addition to the Syntron line of power tools is a new portable electric saw, the Model 52B. Weighing 20 pounds, the saw has a maximum cutting capacity of 3¼ inches with a 10-inch-diameter blade. A new flat-belt drive eliminates the ordinary gear drive with its lubrication and maintenance problems. Write to Syntron Co., 227 Lexington Ave., Homer City, Pa., or circle 253 on card at page 18.

The Black Brothers sleeve clamp illustrated is recommended for attaching the rubber sleeves by which large hydraulic pipelines are joined. These joints provide pipeline flexibility in such uses as dredging, hydraulic mining of sand and gravel, and similar operations. The clamp fits 6 to 30-inch inner-diameter pipe. Write to Black Bros. Co., Inc., Mendota, Ill., or circle 255 on card at page 18.

Tilley floodlight projectors can now be obtained with an adaptor for operation on propane gas. Consumption of gas is reported to be at a rate of 86 to 90 burning hours on a 20-pound tank of propane. Heretofore, the Tilley lights have been restricted to operation on kerosene or diesel fuel oil. Write to Wm. W. Lee & Son, 20 E. Jackson Blvd., Chicago 4, Ill., or circle 256 on card at page 18.



A hard-chrome finish and the elimination of "walking" are features of these new Royal Arc Blue Tip masonry drills offered in both core-type and twin-cutter models. Core-type drills come in sizes up to 2 inches as standard stock and up to 6 inches on special order, while the twin-cutter drills are offered in ¼ to 1-inch sizes. For further information write to Royal Arc Industries, Inc., Chillicothe, Ill., or circle 257 on card that is bound in at page 18.

Training Center Opens For Euclid Dealers

A new General Motors Training Center has been opened in San Leandro, Calif. Courses for Euclid dealer and owner service personnel will be offered on all Euclid earthmoving equipment.

Information and applications for enrollment may be obtained from any Euclid dealer or from the Service Training Department, Euclid Division of General Motors Corp., Cleveland 17, Ohio.

Specialized Equipment For All Makes of Tractors

■ The complete line of specialized tractor equipment made by Fleco for tractors of all sizes and makes is illustrated in a new booklet available on request. The literature gives factual job data from a variety of projects on which the tools have been used.

The booklet is available in French, Spanish, and Portuguese, in addition to English.

To obtain this literature write to Fleco Corp., Jacksonville, Fla., or use the Request Card at page 18. Circle No. 375.

Sika Expands Sales Staff

Cornelius R. Barrett has joined the sales staff of the Sika Chemical Corp., Passaic, N. J. and will represent the company in the New York area.

In his new post, Mr. Barrett will also serve as a concrete specialist and consultant of the Sika firm.

Trencher Equipped to Dig Offset Ditches Can Work Close to Roadside Obstacles

The Model 306 Buckeye ditcher.

■ A Gar-Wood Buckeye ditcher recently developed can dig trenches for roadside drainage where narrow shoulders, sloping banks, or other obstacles ordinarily prevent ditchers from operating.

The innovation in the specially-equipped Model 306 Buckeye ditcher is an offset digging-wheel frame that allows the wheel to be positioned to the left or right of center. With this arrangement the machine can dig a trench in line with the outside edge of its crawler tracks. Like the standard Model 306 utility ditcher, the special model digs up to 5 feet 6 inches deep and 24 inches wide.

The manufacturer reports that one of the new model ditchers will be used for roadside drainage work on the Ohio Turnpike. Two of the first machines produced have been shipped to France, which has many narrow roads flanked by walls or trees.

For further information write to Gar Wood Industries, 36253 Michigan Ave., Wayne, Mich., or use Request Card at page 18. Circle No. 400.

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The Conrad test chamber is used to evaluate concrete samples under temperatures ranging from plus 70 to minus 20 degrees F. The chamber can be pre-set for up to 8 complete cycles a day.

Concrete Test Equipment Simulates Freeze and Thaw

■ Highway engineers can produce freeze and thaw conditions for testing concrete samples with a new environmental chamber developed by Conrad Inc., 183 Jefferson Ave., Holland, Mich.

This single chamber is capable of handling all three ASTM testing procedures automatically. A predetermined test program can be set up with the Conrad chamber, covering from one to eight cycles over a 24-hour period. These cycles include freezing the concrete in air and thawing it in water, freezing and thawing samples in water, and freezing and thawing the material in brine.

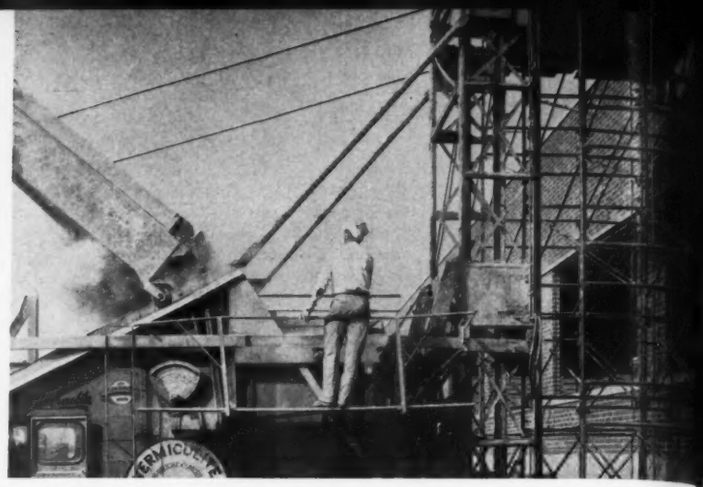
Fifty-five samples can be tested at one time. Temperature range is plus 70 degrees to minus 20 degrees F. The Conrad test chamber can record both physical and electronic tests of highway concrete samples.

For further information write to the company, or use the Request Card at page 18. Circle No. 289.

Woodruff Is Elected To Gibbs & Hill Board

H. Everett Woodruff has been elected to the board of directors of Gibbs & Hill, Inc., New York, N. Y., engineering and construction firm. Mr. Woodruff is also a vice president of the New York Life Insurance Co.

A base course of concrete is built up on a Baltimore wharf as part of restoration work. Premixed aggregate, metered under air pressure, is fed to the "gun" nozzle by the Bondactor unit. At the nozzle the material is mixed with water and air carried separately by Thermoid Aquair hose, and sprayed over the concrete wharf.



Vermiculite concrete for the 145,000-square-foot roof deck of the Strietmann Biscuit Co. bakery in Macon, Ga., is mixed in a 50-cubic-yard Mixermobile before being hoisted to the roof. Vermiculite Placing Co., Atlanta, is laying the 2-inch roof slab on the $3-million bakery.

Complete Literature on Trenchers and Backfillers

■ The entire line of Cleveland trenching equipment, including two new models introduced during 1954, is described in a bulletin from Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 1, Ohio. The two new machines are the Model 240 trencher and the Model 80W backfiller.

The material in the bulletin is arranged to help the reader make a quick comparison of the capacities, specifications, and dimensions of all available models. The literature also describes several models of Cleveland's backfilling machines.

To obtain Bulletin S-120 write to the company, or use the Request Card at page 18. Circle No. 389.

New McDonald Comptroller

Recently named as comptroller of McDonald Bros., engineering and construction firm of Los Angeles, Calif., was Paul Dwight Eastman. A former director of the St. Louis Chapter of the National Association of Cost Accountants, Mr. Eastman previously was associated with the Emerson Electric and Combustion Engineering companies.

More than 10 million cubic yards of material is taken from a channel near Sao Paulo, Brazil, by this dredge with 12-inch pump driven by a Caterpillar D386 diesel engine. Alberto Badra, Miguel Badra, Jr., & Cia Ltda., is using the rig to excavate more than 700 yards in a 10-hour day on a flood-control project.

Borrow material for fills on State Route 128 near Dedham, Mass., is loaded into a truck by a Lorain 820 2-yard shovel. This 3-mile road job, including approaches, ramps, and bridges, being done by A. V. Taurasi Co., Inc., Somerville, Mass., involves 1,125,000 cubic yards of borrow.

New HRB Publications

Two bulletins, a special report, and a bibliography are among recent publications of the Highway Research Board, Washington, D. C. Soils, bituminous mixes, highway taxes, and state highway department organization are subjects treated.

Bulletin 92, "Highway-User Taxation," contains three papers presented at the HRB's 33rd annual meeting last year in Washington. It is priced at 75 cents. "Soil Density and Stability," Bulletin 93, contains two papers presented at last month's meeting. It is priced at 90 cents.

Charts on current organization of the state highway departments in the 48 states, the District of Columbia, Hawaii, and Puerto Rico are presented in Special Report 20, "State Highway Organization Charts," which may be had for 75 cents. A review and digest of available material on the effect of water on bitumen-aggregate combinations is published as Bibliography 17 and priced at 60 cents.

The booklets may be ordered from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

New Work Treats Surety On Contractors Bond

A convenient guide to suppliers and others interested in the protection afforded by the surety on a contractor's bond is provided in "Bond Protection for the Supplier in the Construction Industry," published by the Credit Research Foundation, New York, N. Y. The author is Wayne L. Shaffer, credit manager of a west coast steel company and recent graduate of the Stanford University Graduate School of Credit and Financial Management.

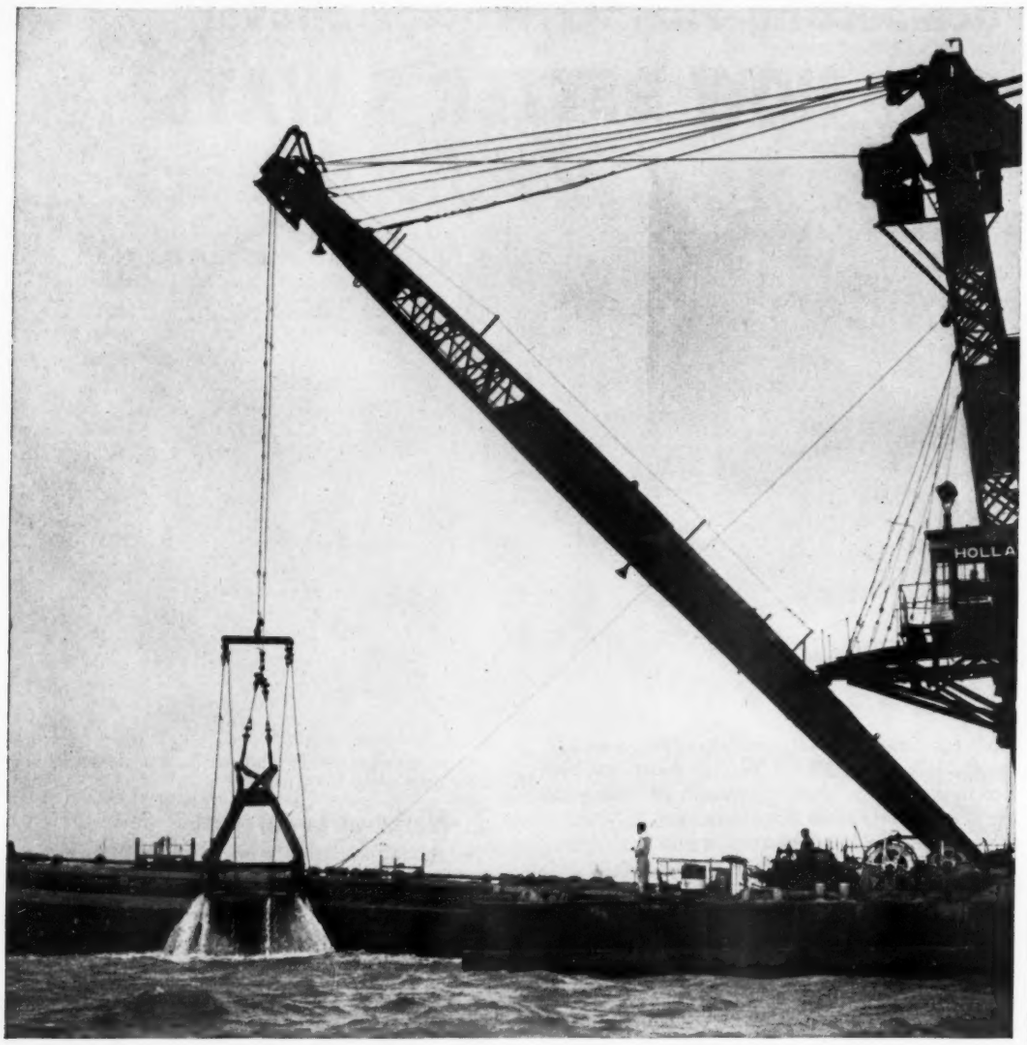
Introductory remarks on the construction industry, contract bonds, and federal bond laws are followed by explanations of the bond laws relating to both public and private work in each of the 48 states and the District of Columbia.

Available from the Credit Research Foundation, Inc., 229 Fourth Ave., New York 3, N. Y., "Bond Protection for the Supplier in the Construction Industry" is priced at $3 a copy in lots from one to nine, $2.85 a copy in lots from 10 to 25, and $2.60 a copy in lots of 26 or more.

CONSTRUCTION CAMERA

Hourly production of 125 tons of crushed stone is maintained by this Cedarapids hammermill, powered by a General Motors Twin 6-71 diesel engine mounted on the truck at center. A GM 4-71 operates conveyors and screens, and a GM 6-71 operates the primary crusher.

Paving the Lake Shore Drive in Chicago proved to be a fast job for Standard Paving Co., Chicago, Ill. The two roadways, half a mile long and 48 feet wide, were put down in 12-foot lanes by this Blaw-Knox paver which laid the hot-mix at an average rate of 24 fpm.



Kuljian Appoints Two To Engineering Posts

William J. Fadden has been appointed chief mechanical engineer of the Kuljian Corp., engineering and construction firm of Philadelphia, Pa. The designer of the Kulculator, a circular slide chart for calculating steam pipe pressure drop and velocity, Mr. Fadden has been in charge of major Kuljian projects for a number of years.

The newly appointed manager of utilities, Daniel H. Dykins, will be responsible for maintaining contact with Kuljian clients engaged in power plant and other utility projects. He has represented the company in negotiations for steam-generating stations for the past ten years.

Prestressed-Concrete Bridge Criteria Published

"Criteria for Prestressed Concrete Bridges," a new and enlarged edition of the 1952 booklet, is being distributed by the U. S. Department of Commerce, Bureau of Public Roads. The criteria presented in the publication have been developed to serve engineers and contractors until such time as more complete specifications are made by code-writing bodies.

The criteria cover design, materials, and construction, together with supporting discussion and source references. The information in the booklet will be reviewed when the code of practice for prestressed concrete, now being developed by a joint committee of the American Society of Civil Engineers and the American Concrete Institute, is published. Copies of "Criteria for Prestressed Concrete Bridges" can be obtained from the U. S. Government Printing Office, Washington 25, D. C., for 15 cents each.

Converted to a dragline, this Gar Wood 75B heavy-duty ¾-yard excavator is used by Joseph Haines, Edgely, Pa., for work on a 10-foot-deep and 22-foot-wide drainage canal in Bucks County, Pa. The unit excavates a total of 810 yards of sand daily from the ⅛-mile-long canal.

Maintaining the New York Barge Canal at a full 12-foot depth and 75-foot width, this barge-mounted Gradall with extension boom and ½-yard bucket works along the entire 801-mile canal system. The rig, owned and operated by the New York State Department of Public Works, here works near Albion.

Revised Edition of Book On Prestressed Concrete

Theoretical principles of prestressed concrete, together with practical design methods, are fully covered in the new Third Edition of "Prestressed Concrete," published by McGraw-Hill Book Co., Inc., New York, N. Y. The book represents an up-to-date revision of an authoritative work by Gustave Magnel, professor of reinforced concrete and construction and director of the laboratory at the University of Ghent.

In addition to general principles and methods, chapters are devoted to statically-determinate beam design, continuous structures, permissible stresses, effect of time and load on prestress, creep of steel and concrete, buckling, tests, applications, and production. Besides these technical aspects of the subject, the book discusses economic features of prestressed concrete construction.

"Prestressed Concrete" is priced at $8, and may be ordered from the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y.

Italian Firm Is Awarded Contract for Equipment

The Italian firm of Industrie Elettriche di Legnano has been awarded a $137,351 contract for the manufacture of three 12,000 to 16,000-kva three-phase transformers for Cheatham Lock and Dam on the Cumberland River near Ashland City, Tenn.

The contract for the U. S. Army Corps of Engineers project was made under the recent executive order which reduces the price differential between U. S. and foreign bids for government contracts. The low domestic bid, submitted by Allis-Chalmers Mfg. Co., Milwaukee, Wis., was $156,028.

Consulting Engineers Firm Names Director

Julius E. Graf has been elected a director of Frederic R. Harris, Inc., consulting engineering firm of New York, N. Y. A member of the American Society of Mechanical Engineers, the Engineers Society of Western Pennsylvania, and Iron and Steel Engineers, Mr. Graf served in an official capacity with several other engineering firms prior to joining Harris.

CONSTRUCTION CAMERA

Working in a narrow area, two Manitowoc Model 3500 cranes lift a 54-ton 175-foot-long girder into place on the New York Thruway bridge spanning the Erie railroad tracks at Suffern, N. Y. The bridge, scheduled to be completed this June, is being built by Klevens Corp., Yonkers, N. Y.

Grading a site for a $3 million school on the bluffs along Asbury Road, Dubuque, Iowa, are two International TD-24's pulling and push-loading a scraper. This 80,000-cubic-yard earthmoving assignment is being done by C. P. Minnaert, Cuba City, Wis.

Engineering Soil Survey For New Jersey Counties

A series of reports on soil conditions in New Jersey counties, for the use of highway engineers in locating and relocating road alignments and in finding suitable material for fills, is being published by the Rutgers University Press, College of Engineering, New Brunswick, N. J.

Thirteen reports covering fourteen counties are now in print. Six reports priced at $1 each, cover Essex, Passaic, Bergen and Hudson, Union, Hunterdon, and Somerset counties. The seven other reports are priced at $1.50 each.

The booklets, a Joint Highway Research project sponsored by the University and the New Jersey State Highway Department, are collectively titled "Engineering Soil Survey of New Jersey."

The reports use a uniform editorial approach. Each contains a brief description of the environmental factors partly responsible for the soil character and soil problems in the county, a description of the major soil groups in the county, and comments on land form, soils, drainage conditions, and engineering aspects of the various types of soils. Summaries of test data are included in comprehensive tables. A series of reduced-scale maps for the county is included in a folder at the back of the booklet.

Copies of bulletins covering Ocean, Morris, Middlesex, Sussex, Mercer, Warren, and Salem counties, as well as Report No. 1, "Environment and Research Procedures" may be obtained from the university for $1.50 each. Bulletins covering seven other counties will shortly be published.

Book on Housing Design

Design problems in both public and private housing are discussed in a new book, "Housing Design," written by Eugene Henry Klaber and

Concrete placement for a structure on the Maine Turnpike extension is handled by a Bucyrus-Erie 22-B crane for W. H. Hinman, Inc., North Anson, Me. The 66-mile stretch from Portland to Augusta, to be completed this year, is being built at a cost of $55 million.

Sticky blue clay in a 55-foot-deep cut—one of the deepest on the Maine Turnpike—is loaded by a LeTourneau-Westinghouse Tournapull operated by Yonkers Contracting Co., Yonkers, N. Y. Despite 97 days of rain in the first 154 scheduled working days, the company is well along on its 3-million-yard excavation job.

published by Reinhold Publishing Corp.

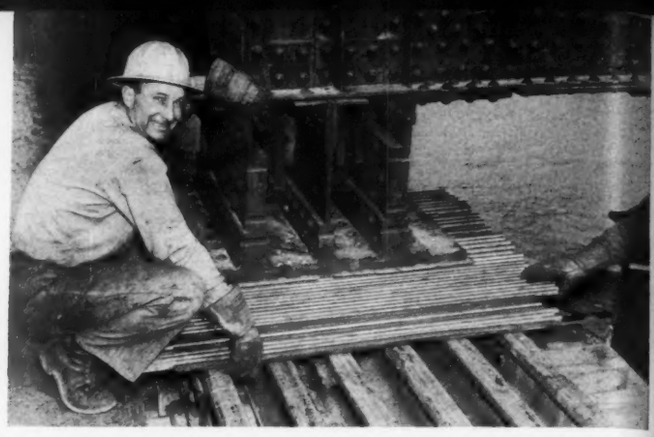
Subjects covered in the book include apartment floor plans, building plans, site layouts, site selection, topography, site planning methods, building units, and dwelling units. Designs of more than 125 outstanding architects are used to illustrate the material. A bibliography, list of terms, and index supplement the 240 pages of text. Priced at $8.50, the book may be ordered from the publisher, 430 Park Ave., New York 22, N. Y.

Accident Prevention Book Outlines Safety Program

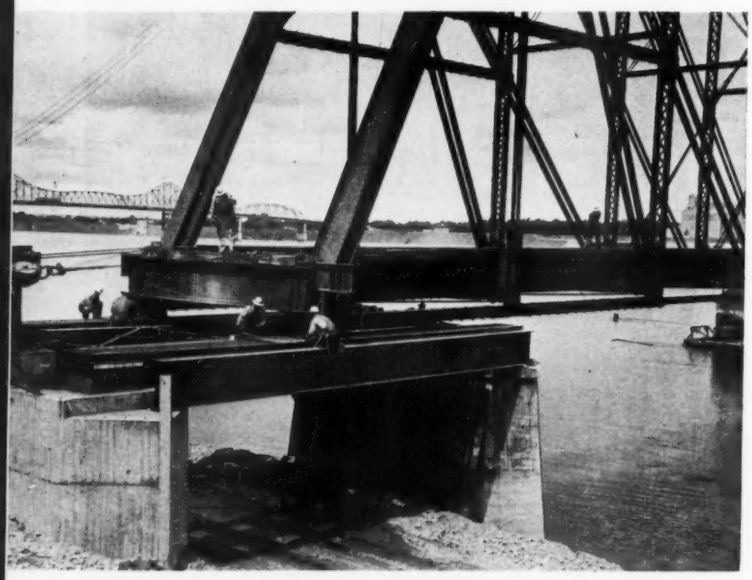
A 10-point construction safety program for contractors is included in the booklet, "100 Ways to Save a Buck," published by the National Safety Council. The book, a reprint of a talk made by John A. Volpe before the council's construction section at the 39th National Safety Congress, outlines the ways in which safety paid off for the Volpe Construction Co., Malden, Mass.

Single copies of the 32-page illustrated booklet may be had on request from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

A derrick car crane removes a 40-foot girder spanning the old and new piers in preparation for moving the truss span onto the new pier at left. Block and tackle lines shown just below the girder will pull the span to new location.



One-inch-round hard steel rollers under the shoe of the truss span will roll along the six skid rails as the span is pulled to the new pier. The skid rails are laid on a temporary skid frame spanning the opening between the old and new piers.



As the span is pulled along the skid rails to the new pier, workmen place the steel rollers in front of the span shoe. The block and tackle arrangement to the left is operated by a locomotive crane not visible in the picture.

Railway bridge gets ten new piers and lift span

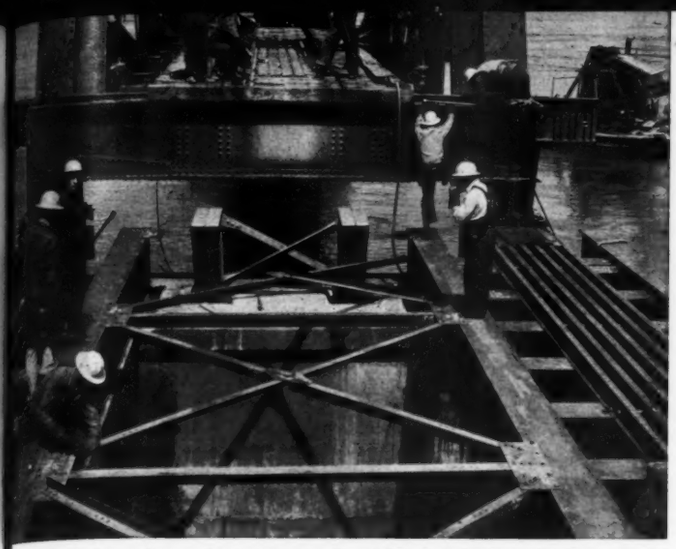
Ten new concrete piers have been built and nine 250-foot-long truss spans moved 41 feet longitudinally onto new seats in a $6-million reconstruction project on the Northern Pacific railway bridge over the Columbia River between Pasco and Kennewick, Wash. The remodeling program also included substitution of a new 307-foot-long vertical lift span for the old swing span, and raising of the entire bridge 4 feet above its previous height.

During the 2½ years that work was in progress, railway traffic continued to use the bridge virtually without interruption. The longest the bridge was closed was a 12-hour period on the day the swing span was moved out and the new lift span floated into place.

Contracts for both the substructure and superstructure phases of the job were awarded to the Kansas City Bridge Co. and the Massman Construction Co., both of Kansas City, Mo. Work on the substructure got under way May 12, 1952, and on the superstructure, April 1, 1953. The entire project was completed in mid-October of 1954.

The Northern Pacific bridge, which carries an average of 30 trains a day, has been in continuous use since 1888. In 1905 and 1906 the superstructure was reinforced and partially rebuilt to carry the larger locomotives then coming into use, and since that time the bridge has required only periodic maintenance work.

Construction of McNary Dam on the Columbia and the subsequent formation of the dam reservoir necessitated the extensive remodeling



This view shows the gap between spans 9 and 10 after the latter has been moved onto new piers. At the top (center) may be seen the end of the 40-foot-girder, first removed from ahead of the span, which will be placed across the gap left behind.

Entire structure is realigned and elevated as extensive remodeling program proceeds without disrupting traffic

program completed last fall. McNary reservoir pool has a water surface elevation 23 feet higher than that of the river when the bridge was built, and elevation during flood periods is several feet higher than that for which the bridge was originally designed. The reconstruction job was required both to allow for additional buoyancy and ice action against the piers and to give some clearance under the bridge during flood periods.

Four alternative methods of meeting the new river conditions were considered by Northern Pacific before the remodeling program was undertaken. It was decided that strengthening of the existing piers would be impractical because of the large amount of riprap around them and the difficulty of driving piling and building cofferdams. A plan to construct new piers at the location of the old ones was also rejected because of the hazards involved in supporting the trusses with falsework, the time element involved, and the necessity of maintaining train schedules. The enormous cost and difficulty of obtaining such a large quantity of steel were factors in dismissing the idea of building a bridge at a new site.

The remodeling plan finally adopted provided for new piers adjacent to the old ones, a vertical lift span to replace the old swing span, and an over-all bridge elevation 4 feet higher than before. Under this plan much falsework was eliminated and traffic could continue both over and under the bridge during construction.

Pier Work

The stream bed at the bridge site consists of a layer of from 3 to 15 feet of cemented sand and gravel which overlays a ringold formation. The ringold, a brittle blue-gray clay-like material which is firm and non-plastic, was the material on which the piers were landed. Since the formation proved firm enough to stand vertical without sloughing, it was possible on some of the cofferdam piers to excavate on the neat line of the pier footings and pour concrete in the excavation without the usual forms. Above the ringold, concrete forms were used. Generally, excavation for the piers was stopped after a depth was obtained in the ringold of 8 feet for the fixed-truss piers and 10 feet for the lift-span piers.

Pneumatic caisson construction was necessary at lift-span piers 7 and 8 because of the proximity of the existing end piers of the old swing span. As the new piers 7 and 8 had larger bases, excavation operations were carried on quite close to the old pier footings. The open cofferdam method, therefore, might have endangered the stability of the old piers.

The caissons were of steel construction and had sides which allowed attachment of a removable timber cofferdam. They measured 36 feet wide, 72 feet long, and high enough to provide a working space of 7 feet. The bottom outside edges were equipped with a nose angle or cutting edge. The caissons were positioned accurately at the pier location with the aid of guide piling which had previously been driven. Excavation in the ringold formation was carried out under dry conditions, and within three weeks of preliminary work, the caisson was sealed with concrete.

(Continued on next page)

Kansas City Bridge Co.'s derrick car crane lifts a 40-foot girder and prepares to place it in the opening between the two spans. Later this girder will again be removed and the middle span moved to the lift so as to rest on the new piers.

(*Continued from preceding page*)

Open cofferdam work had been planned for piers 3, 4, 5, and 6, but when the contractor experienced considerable difficulty in driving steel sheet piling through the sand and gravel, it was decided to use the pneumatic caisson method on these piers. This change increased the construction costs by approximately $250,000.

Once pier work was completed, crews started on the superstructure work of moving girders and truss spans. All this work was done with a minimum of delay in train traffic. Railroad schedules permitted daily train-free periods between 11 a. m. and 3 p. m., and the bulk of work was done during this period.

Moving Trusses

Preparations for moving each 500-ton truss span usually took from 4 to 5 days. First to be moved was the span at the Kennewick end of the bridge. A temporary bridge structure called a skid frame was erected at each end of the truss, spanning the 41-foot opening between the old and new piers. Skid rails were placed on top of the frame, and rollers for moving the truss were laid across these rails. A block and tackle arrangement was used in moving the spans.

After morning passenger trains had passed over the bridge, the facility was closed for four hours. A locomotive crane was stationed on the approach at the west end of the bridge. A derrick-car crane removed the track and 40-foot girder just ahead of the span, after which the locomotive crane began moving the span with the block and tackle. The crane moved 10 feet for each foot the span moved. Actual moving time for each span was about 20 minutes. After the span was moved onto the new piers, the derrick car placed a temporary girder in the opening left behind the span.

All the moves were similar in procedure, except that the time during which the bridge track was out of service varied from one to four hours. This operation was carried out without incident, a new span being moved as soon as preparatory work could be done. When the spans were all resting on the new piers, 40-foot girder spans were temporarily placed between the ends of the swing span and the fixed truss spans on the new piers.

Raising of the bridge was done section by section. First, the three spans on the Pasco side and the far end of the last fixed span on the Kennewick side were raised the full 4 feet 2 inches, leaving inclines on both sides of the draw span. Maximum incline of any one 250-foot span was 20 inches. This gave the bridge a saucer-like appearance for a long time, but the elevations had no adverse effect on train travel. With the raising of the bridge at each end, it was possible to also raise the approaches and do other miscellaneous work attendant to the raising operation.

Raising of the truss spans was accomplished by jacking in 10-inch increments. Hydraulic jacks of 110-ton capacity, four to a span end, were used. The full 10 inches was obtained by raising the two trusses over one pier simultaneously, 1 to 1½ inches at a time, placing blocking under the shoes, and repeating until full lift was obtained. Then collars were placed in the jacks while the blocks were removed, and grillage placed under the shoes. After this, the jacks could be moved to the next pier. Precautions were taken to keep blocking well up under the bridge shoes to prevent a fall in case of jack failure. Approaches were raised by placing gravel fill and topping it with an 8-inch layer of crushed rock ballast.

Lift Span

The 1,100-ton vertical lift span was assembled on a temporary pile trestle placed downstream from the bridge on the Pasco side. Previously, a contractor's construction spur had been installed on top of the dike at the Pasco end at an elevation about equal to the top of the tie on the old bridge. By building out from the dike over the river, the contractor had a lift-span erection trestle which permitted

A new 307-foot-long vertical lift span is floated into place between the new mid-channel piers. Four barges pushed and pulled by tugs transport the span to position. Water will be pumped into the barges to lower the span onto pier seats.

direct connection to railway trackage. The lift span was assembled as complete as possible on the erection trestle to cut down the time the bridge would be closed to navigation after the lift span was installed. Machinery and control devices were installed prior to floating in the span.

Four barges were used to remove the old swing span, and four used to float in the vertical lift span. August 9, 1954, was the day selected for substituting the new span, and 12 hours of train-free time beginning at 5 a. m. was requested from the office of the superintendent of the line.

The track rails at the ends of the swing span were removed, along with the temporary 40-foot spans. The swing span had previously been disconnected from the piers. Pumps were started on four barges which had been positioned just underneath the span, and soon the truss was clear of the center-pin connection on the pivot pier. Two large river tugs were connected to the barges, and they moved the swing span out and downstream to a dismantling berth.

The same river tugs were then attached to the barges under the vertical lift span. As these barges were unwatered, the lift span came free from its supports on the temporary construction trestle. Then the barges were pulled and pushed out into the stream and between the new center-span piers. Cables from the barges to the locomotive crane and derrick car on the bridge helped to center the lift span.

By noon the lift span was in position, although still resting on the barges. Water was pumped into the barges, and gradually the span came to rest on its piers. Then the barges moved out, tower span girders were placed, and ties and rails laid down so that the bridge could be opened to traffic at shortly after 5 p. m. the same day.

Work remaining on the project was completed in about two months. This consisted of raising six truss spans to full height of 4 feet 2 inches above original elevation, setting the new vertical lift span to meet the final elevation of the truss spans, and encasing in concrete the steel grillage used for raising the truss span.

Personnel

Harry Pyle was superintendent for the Kansas City Bridge Co. and the Massman Construction Co. Consulting engineering firm on the job was Howard, Needles, Tammen & Bergendoff. J. E. Hoving, assistant chief engineer for the Northern Pacific Railway Co. at Seattle, Wash., was in charge of the entire project for the Northern Pacific Railway. M. O. Woxland, assistant bridge engineer for the line, was in charge of bridge construction, and C. E. Ekberg, bridge engineer at St. Paul, handled review and approval of all plans prepared by the consulting engineer. THE END

Detroit Diesel Assigns Salesman to Midwest

The Detroit Diesel Engine Division of General Motors Corp., Detroit, Mich., has appointed Charles H. Stewart as factory sales representative to seven midwestern states. He succeeds William R. Bays, now GM diesel distributor at Wichita, Kans.

Mr. Stewart, who will serve GM diesel distributors in the Dakotas, Minnesota, Nebraska, Iowa, Kansas, and the western half of Missouri, has been with the division since 1946.

WEATHER CHARTS

March Temperatures and Precipitation

The accompanying maps indicate the probable number of days with precipitation and below-freezing temperatures during March. Black lines on chart 1 show the number of days during the month when precipitation will total .01 inch or more. Areas between the black lines should experience .01 inch of precipitation for the number of days indicated on the map. Chart 2 indicates the number of days when precipitation will total 1 inch or more. On both charts, lines marked .25 and .10 mean that this amount of precipitation occurs once every 4 years and once in 10 years, respectively.

Chart 4 shows the number of days when snowfall will measure 1 inch or more. Chart 3 shows the expected number of days during the month when temperatures will be below freezing.

Prepared for *CONTRACTORS & ENGINEERS* by Weather Corp. of America, the charts show only expected weather conditions. They are not specific forecasts. Maps are based on March records of conditions at 50 weather stations throughout the country, and they may be retained for future use.

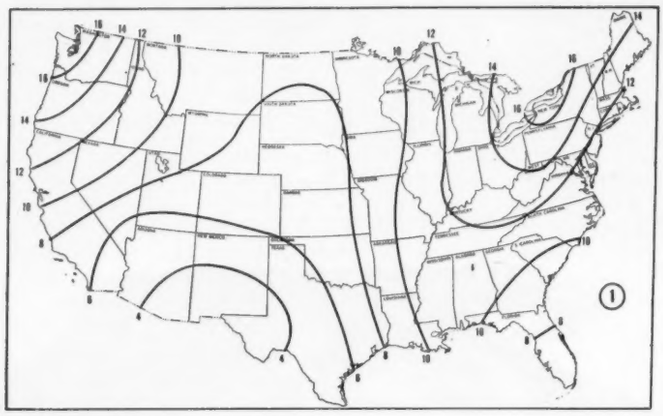


Chart 1: Days with .01 inch or more of precipitation.

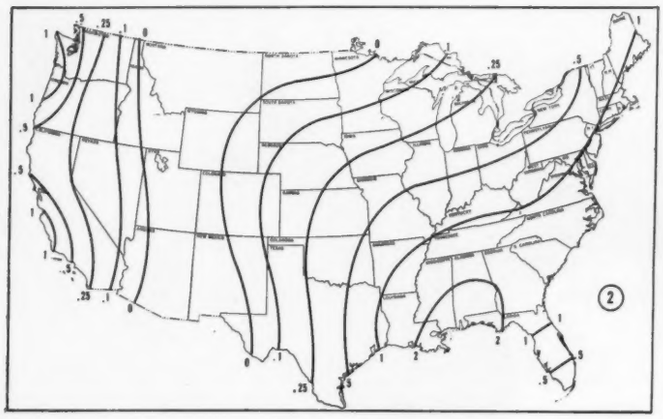


Chart 2: Days with 1 or more inches of precipitation.

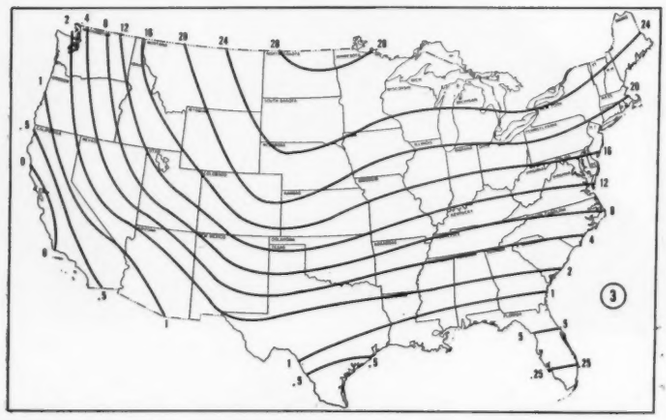


Chart 3: Days with temperatures below freezing.

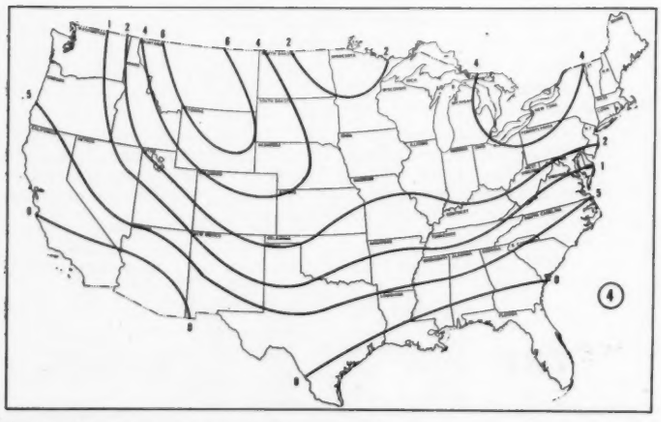


Chart 4: Days with 1 or more inches of snowfall.

Lightweight High-Capacity Materials Feeder Vibrated by Eccentric Action of Flywheels

The Barber-Greene Redi-Flow vibrating feeder features a simple but effective vibrating device. The entire feeder and hopper are vibrated by the eccentric action of counterweighted flywheels.

■ Capable of capacities in excess of 300 tons per hour, Barber-Greene's new lightweight Redi-Flow vibrating feeder features a simple and effective mechanical vibrating device. The feeder and hopper are continuously vibrated by the eccentric action of counterweighted flywheels. This makes it possible to regulate the capacity of the unit accurately by any of three means: by changing the weights on the flywheels; by altering the slope of the feeder itself; or by changing the amount of weight on the control gate.

The Redi-Flow is made in 20 and 26-inch widths for feeding 24 and 30-inch belts, respectively. It will handle lumps up to 12 inches if they are mixed with fines or lumps up to 8 inches if they are of uniform size. Capacity averages about 200 tons per hour for the 20-inch unit and 300 tons or more for the 26-inch unit. Both handle sand, gravel, crushed stone, slag, cinders, and similar materials. Because of its short stroke and compactness, the feeder discharges very close to the belt to prevent impact damage to the belt or carriers.

For further information write to Barber-Greene Co., 400 N. Highland Ave., Aurora, Ill., or use the Request Card that is bound in at page 18. Circle No. 393.

Data on Friction Parts For Tractors and Trucks

■ Two catalogs cover the latest additions to the Velvetouch line of all-metal clutch plates, facings, automatic transmission disks, and brake linings.

Catalog No. 55-T is devoted to the line's selection of replacement friction parts for tractors and industrial equipment. Catalog No. 55-A lists replacement parts for trucks, buses, etc.

To obtain this literature write to S. K. Wellman Co., 200 Egbert Road, Bedford, Ohio, or use the Request Card at page 18. Circle No. 370.

Universal Atlas Cement Makes Four Promotions

Four promotions within the sales organization of Universal Atlas Cement Co., New York, N. Y., subsidiary of U. S. Steel Corp., have become effective.

Harry E. Bergold and W. Troy Gaunt have been advanced from district sales managers to serve as sales managers of the Albany, N. Y., and St. Louis, Mo., territories, respectively.

Former salesman John J. Crowley has been made assistant sales manager at Pittsburgh, Pa., and James J. Hunter, former chief clerk at the company's Minneapolis, Minn., office, has been made assistant sales manager at Minneapolis.

New District Office For Fuller Mfg. Co.

The states of Texas, Louisiana, Mississippi, Oklahoma, Arkansas, Missouri, and Kansas, as well as the Memphis, Tenn., trading area, will be served by the newly organized southwest district office of the Fuller Mfg. Co. of Kalamazoo, Mich. The district, with offices at Tulsa, Okla., will operate under the direction of Howard J. Passage.

CLASSIFIED ADVERTISING

An advertising inch in the Trading Post is measured ⅞-inch vertically on one column. Space reservation close in the New York office on the 10th of the month preceding publication. Send your classified copy to:
The Trading Post, Contractors & Engineers
470 Fourth Avenue, New York 16, N. Y.

POWER AUTHORITY OF THE STATE OF NEW YORK

ADVERTISEMENT FOR PROPOSALS

FOR

CONSTRUCTION OF
LONG SAULT DAM
NEAR MASSENA, ST. LAWRENCE COUNTY, NEW YORK
SPECIFICATION NO. PA-5-11002
ST. LAWRENCE CONTRACT NO. 8

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the construction of Long Sault Dam and appurtenant works near Massena, St. Lawrence County, New York until 10:30 A.M. Eastern Standard Time on the 9th day of March, 1955 at the Authority's office, 270 Broadway, Room 1207A, New York 7, New York, at which time and place proposals will be publicly opened and read aloud.

The principal items of work are:

Estimated 5,752,000 cu. yds.	Earth or rock excavation, for Cut F and channel work
1,189,000 cu. yds.	Embankment and riprap for wing dams, dike and roads
300,000 cu. yds.	Earth excavation for dam
75,000 cu. yds.	Rock excavation for dam
700,000 cu. yds.	Borrow excavation
407,200 cu. yds.	Concrete
2,431 tons	Structural steel
5,809 tons	Erection of gates and cranes
76,000 lin. ft.	Drill holes for exploration and grouting

The work shall be completed on or before December 30, 1958.

Plans, specifications and Proposal Forms for the work will be on file after January 7, 1955 in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and the Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, and may be inspected by prospective bidders during office hours.

Plans, specifications and Proposal Forms may be obtained from the Power Authority of the State of New York, 270 Broadway, Room 1300, New York 7, New York, after January 7, 1955 upon application and prepayment of a fee of Fifty ($50.00) dollars per initial set and Twenty-five ($25.00) dollars per set for additional sets, no part of which will be refunded.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 10 percent of the gross sum bid except that guarantee in excess of $2,000,000 will not be required.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

INDEX TO ADVERTISERS

(Names in italics are advertising agencies)

MANUFACTURER MEMOS

Le Tourneau-Westinghouse Effects Purchase of Adams

The J. D. Adams Mfg. Co., Indianapolis, Ind., manufacturer of road-building and earthmoving equipment, last month merged with LeTourneau-Westinghouse Co., Peoria, Ill. The purchase includes Adams' inventories, receivables, and approximately 500,000 square feet of completely equipped plant and manufacturing facilities in Indianapolis and Canada.

Adams products will continue to be produced in Indianapolis and Canada with the plants there to be known as the Adams Division of LeTourneau-Westinghouse. No immediate change will be made in the distribution, production, or managerial policies of the division.

Howard R. Meeker, president of Adams, is the new chairman of the board of LeTourneau-Westinghouse.

Caterpillar Promotes Two

The new assistant manager of Caterpillar Tractor Co., Peoria, Ill., is Merle W. Dargel. Since starting with Caterpillar in 1937, Mr. Dargel has served the company as staff service engineer, manager of service engineering, and eastern service manager. In his present position, he will be responsible for service engineering and development and for service publications.

The former central service manager, Bruce T. Smith, succeeds Mr. Dargel as eastern service manager.

Hyster Export Sales Head

Recently named export sales manager for the Hyster Co., Portland, Oreg., was Harvey A. Raasch. Previously, he was with the Le Roi Co.

Mr. Raasch will direct overseas marketing for the Hyster line of industrial lift trucks and construction equipment from his headquarters in Peoria, Ill.

Edwin J. Schwanhausser, recently elected president of Worthington Corp.

Worthington Executives Assigned to New Posts

Executive reorganization of the Worthington Corp., pump manufacturer of Harrison, N. J., has been completed. Taking the post of president of the company is Edwin J. Schwanhausser. He will be succeeded as executive vice president by Walther H. Feldmann.

Thomas J. Kehane has accepted Mr. Feldmann's former position as vice president in charge of sales, and William A. Meiter has been promoted to general sales manager, a post held by Mr. Kehane prior to his present appointment. Vice president in charge of planning is Charles A. Butcher.

Simultaneous with these appointments was that of Hobart C. Ramsey, former Worthington president, to the position of chairman of the board. He succeeds Howard Bruce who has been elected chairman of the executive committee. Clarence E. Searle, although retiring as vice chairman of the board, will continue as a director.

Le Roi Names Permar Field Sales Manager

The Le Roi Division of Westinghouse Air Brake Co., Milwaukee, Wis., has appointed Don S. Permar to the newly created post of field sales manager. Mr. Permar will be responsible for the management of Le Roi field sales organization and will act as liaison between the factory and the field sales staff.

Mr. Permar has been with the company, manufacturer of portable compressors, front-end loaders, and heavy-duty gasoline engines, since 1945.

Don S. Permar, newly appointed field sales manager of the Le Roi Division of Westinghouse Air Brake.

McClure Kelley, executive vice president of the Baldwin-Lima-Hamilton Corp.

Executive Reorganization At Baldwin-Lima-Hamilton

The first step in a new program of expansion and diversification of the Baldwin-Lima-Hamilton Corp., Lima, Ohio, has been taken with the appointment of McClure Kelley as executive vice president.

At the same time Oliver DeG. Vanderbilt, 3rd, was elected a director and vice president in charge of all commercial activities of the corporation. Both Mr. Kelley and Mr. Vanderbilt will make their headquarters in Philadelphia, Pa.

Four other company officers elected are: Marvin W. Smith, chairman of the executive committee; Ralph K. Stiles, president of Austin-Western, Co., Aurora, Ill., a B-L-H subsidiary; Henry F. Barnhart, general manager of the construction machinery division; and Henry F. Lockhart, director of sales for the construction machinery division.

Homelite Elects Two As Vice Presidents

The Homelite Corp., Port Chester, N. Y. has elected two new vice presidents of the firm, Albert K. Newman, who will be in charge of engineering, and Richard C. McDonald, as vice president of manufacturing.

Chief engineer at the company since 1948, Mr. Newman holds a bachelor's and master's degree in

Albert K. Newman, vice president in charge of engineering for the Homelite Corp.

electrical engineering from Massachusetts Institute of Technology and is a registered professional engineer in the state of Connecticut. He is a member of the American Society of Electrical Engineers.

Mr. McDonald has served Homelite successively as manager of the Chicago sales office, assistant factory manager, and as factory manager.

New Department Head For Dow Chemical Co.

Bernard P. Thomas has been assigned to direct the highway construction and materials department of the Midland, Mich., division of the Dow Chemical Co. He replaces the late Herman H. Miller.

The department, formerly known as Dowflake Technical Service, will function as both a research and service laboratory and as a service department for Dow production and sales. Chief function of the department is the development of new uses for calcium chloride and magnesium oxide in the highway and construction field.

Two Assistant Engineers Named by American Hoist

William Niessen and Kenneth F. Potter have been appointed assistant chief engineers by American Hoist & Derrick Co., St. Paul, Minn.

A graduate of Drexel Institute of Technology and Massachusetts Institute of Technology, Mr. Niessen was formerly associated with Bethlehem Steel Co. He has been with American Hoist since 1940. He will be responsible for revolving cranes, derricks, hoists, wire-rope blocks, and the electrical and structural design of the company's products.

Mr. Potter, with the company since 1927, served as American Hoist's mechanical-engineering representative in Washington, D. C., during World War II. Mr. Potter will be in charge of crawler, rubber, and rail-mounted cranes, and all mechanical design for the company.

Over 2 yards of clay in the bucket of this 1-yard MICHIGAN, owned by Leonard Elam, Gardner, Illinois

Get a Bonus in Every Bucket!

——— *with a* MICHIGAN

Notice two facts about this operation:

1 **More than 2 yards in that 1 yard capacity bucket—a 100% bonus load!**

The independent bucket control on MICHIGAN tractor shovels makes this kind of performance possible. Two powerful double-acting cylinders on the MICHIGAN bucket provide tremendous break-out power, enable the operator to "work" the bucket while it's buried deep in the pile. His bucket-control lever *over-rides* the boom-hoist, so he doesn't have to lift the bucket out of the pile *until* he's got a heaping bonus-load.

2 **All wheels solidly on the ground!**

Here's proof of the MICHIGAN'S bonus margin of weight distribution. These are the heaviest, most powerful tractor shovels on the market today. Even with a 100% bonus bucket load, you still have complete stability and traction.

One brief demonstration will convince you quickly that you'll get a Bonus Bucket every time with a MICHIGAN Tractor Shovel—for more yardage moved, in fastest time, at lowest cost. Such a test is easy to arrange—simply call your nearby MICHIGAN distributor; or use the coupon. MICHIGAN Tractor Shovels are available under the Clark leasing Plan—we'll be glad to send you details.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
384 Second Street
Benton Harbor, Michigan

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What's this about demonstrating the MICHIGAN Tractor Shovel?

Also, send us ☐ Specifications . . . and ☐ Lease Plan data sheet

Name_____

Firm_____ Title_____

Address_____

City_____ County_____ State_____